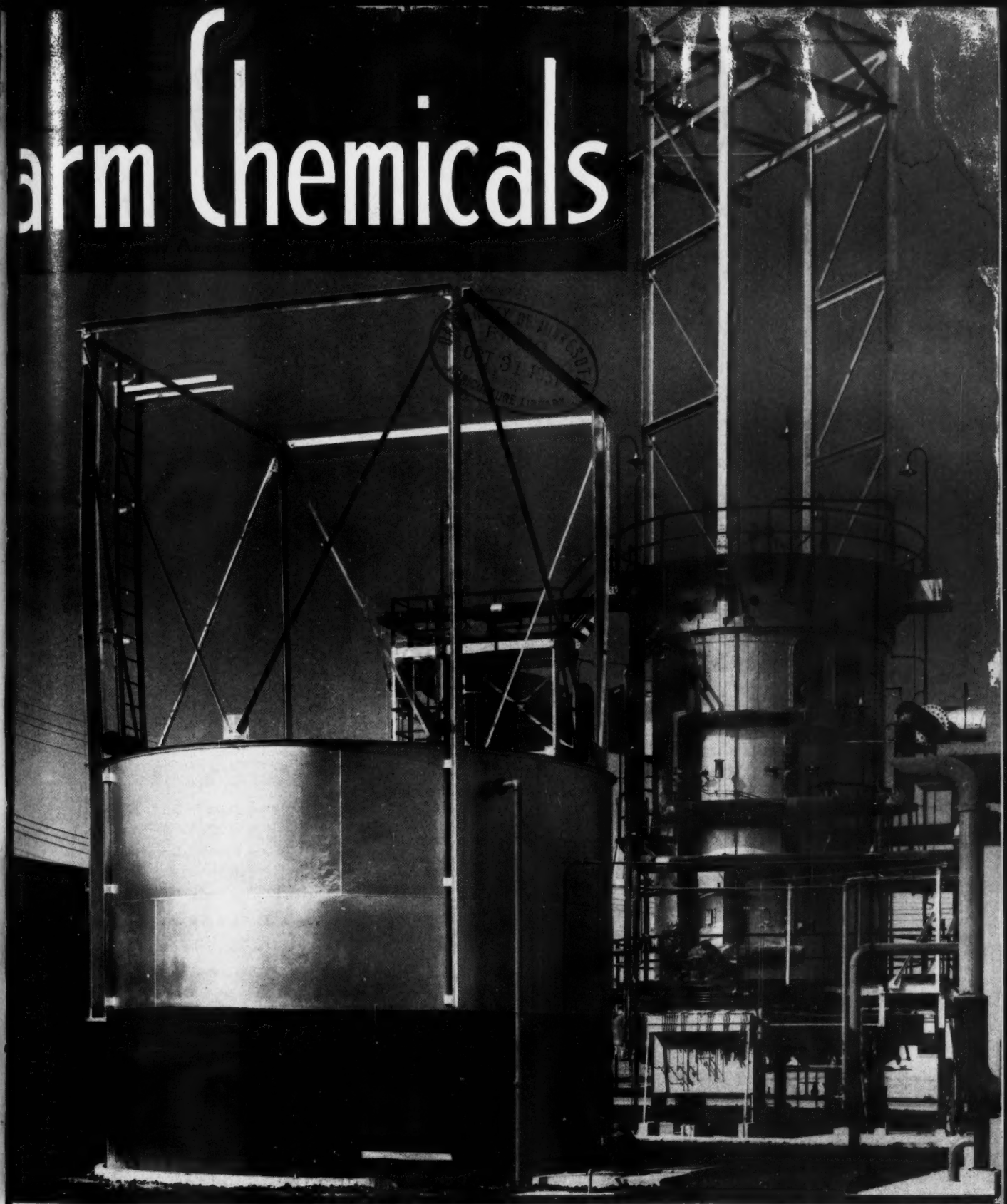
arm Chemicals



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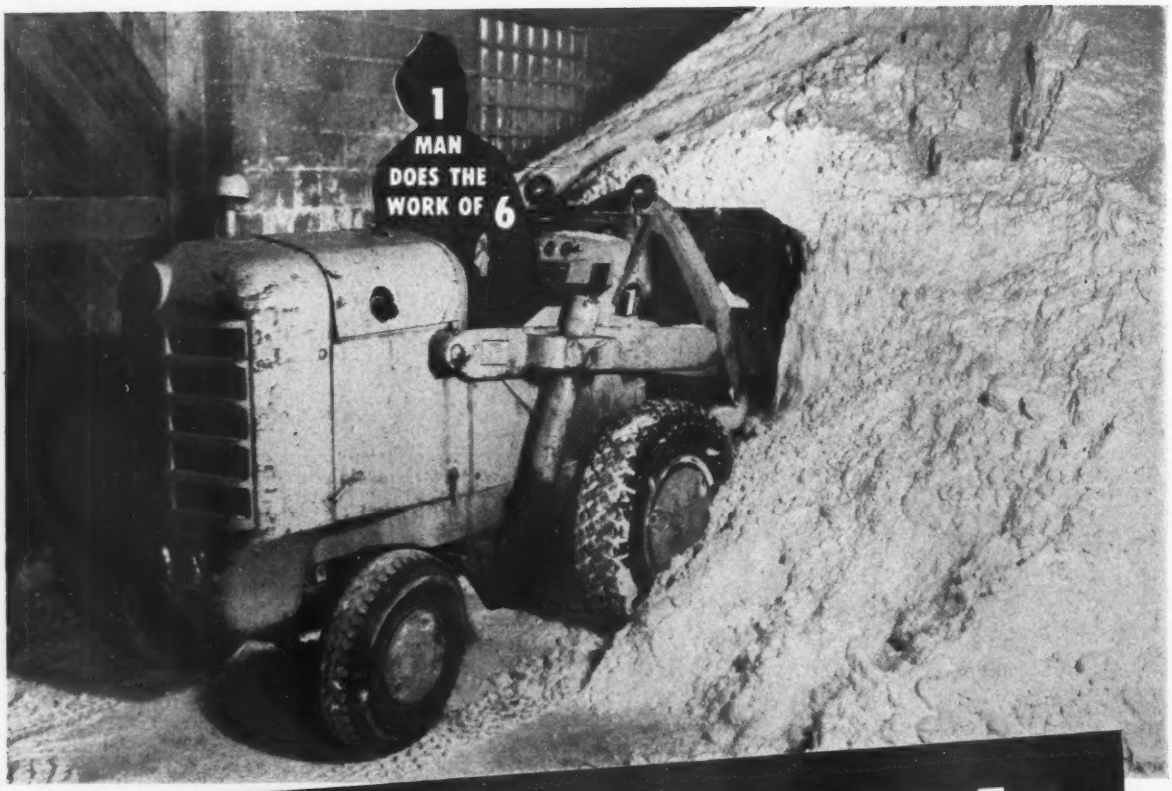

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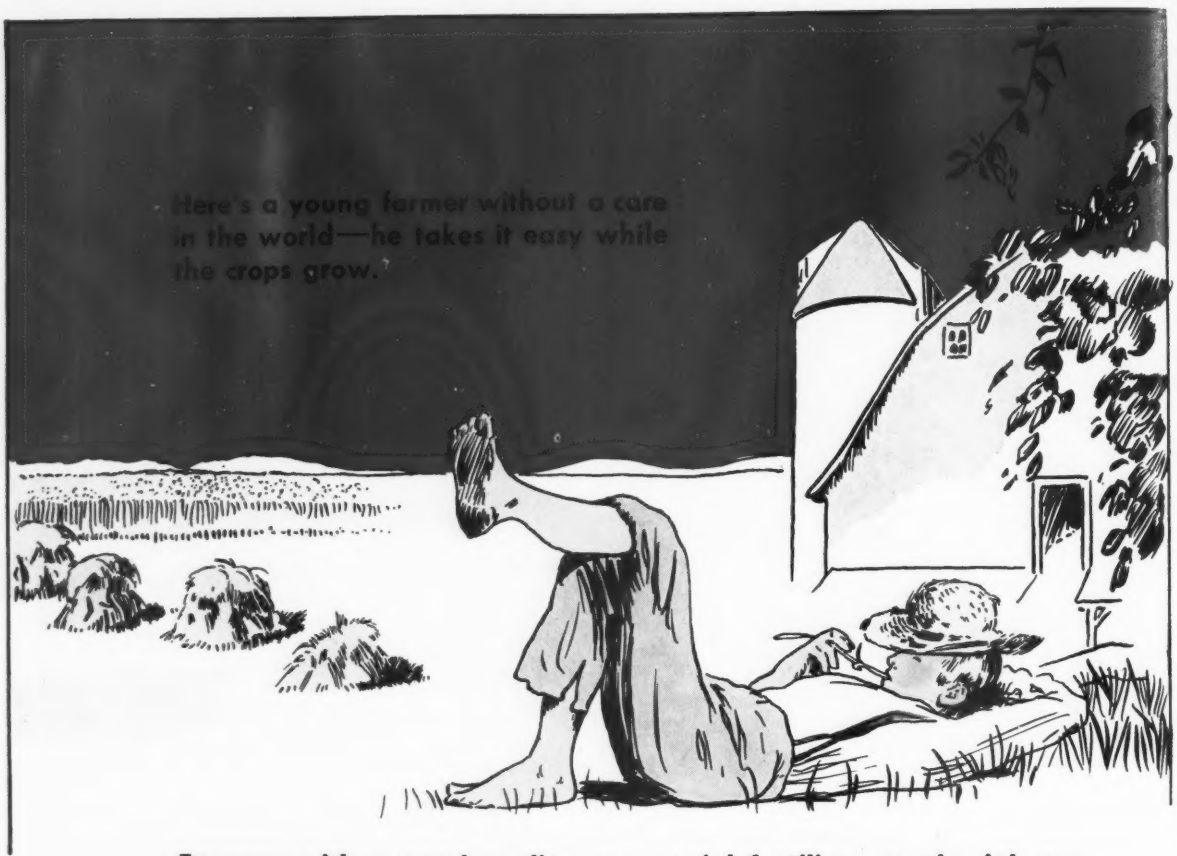

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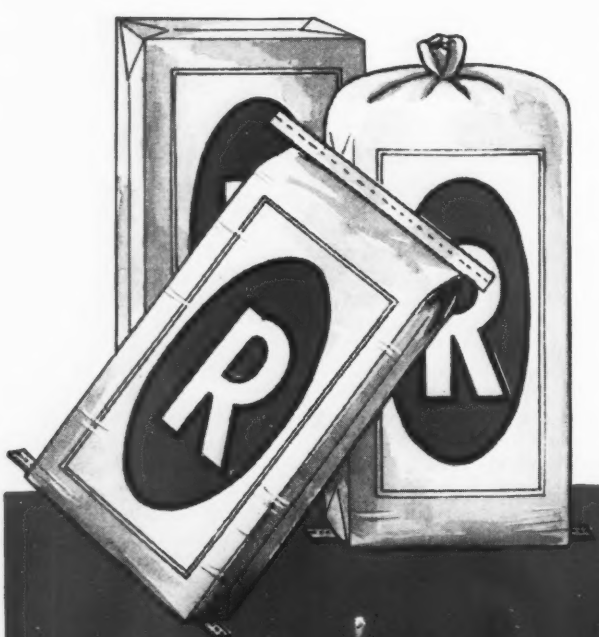

Producers, packers, and shippers of fertilizer, too, never have a worry when their products are packed and shipped in RAYMOND MULTI - WALL PAPER SHIPPING SACKS

. . . the fertilizer Shipping Sacks that are CUSTOM BUILT to their individual requirements.

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RAYMOND
MULTI-WALL PAPER SHIPPING SACKS

In this issue . . .

"Farm chemicals facts . . . briefly noted." That's the title of our newest department, appearing for the first time in this issue and located on page 5. In it each month you will find facts, stated as briefly but accurately as possible, which we hope will help keep you better informed about this very busy and increasingly important farm chemicals industry.

At its 18th annual meeting at Spring Lake, N. J., this year, the National Agricultural Chemicals Association again brought together hundreds of representatives of the pesticide industry. There, in an atmosphere of congenial good will, the industry thrashed out some of its most vexing problems and gave its members a fresh and encouraging look at the future. For a report on some of the things accomplished, see page 11.

Sulfur in crop production has, in the past, been considered of "minor" importance. Recent studies, however, indicate that sulfur plays a major role in plant growth both as to quantity and necessity. Furthermore, sulfur-bearing fertilizers are an important source of the needed element. These conclusions and the reasons for them are ably presented by Dr. C. E. Millar in an article beginning on page 17.

A unique system for handling nitrogen solutions in the production of ammoniated phosphate-bearing fertilizers has been devised by two technical sales representatives of the Spencer Chemical Company. Using materials recommended and supplied by the J. M. Tull Metal and Supply Co., the sales-engineers have greatly increased production at the ultra-modern Etiwan Fertilizer plant in Charleston, S. C. Built around the introduction of dual-acting measuring tanks for delivering nitrogen solutions to the mixer, the system was designed to work in conjunction with an Inglett Automatic batch-weighing system. Complete details and photographs of the installation are given in the staff-industry report starting on page 22.

How to raise more capital at the time it is needed most, is a problem that confronts many operators of thriving but small farm chemicals plants. All too frequently, the biggest block to expansion when it would be most likely to succeed, is the lack of a proper approach to the business of raising money. How to go about it in a common-sense manner without losing control of the organization is discussed by business-writer Ernest W. Fair, in an article that starts on page 27. Mr. Fair's articles on financing small-scale industrial operations have appeared in a variety of trade and business publications, and we are happy to have him with us this month.

Aerial application of farm chemicals—both fertilizers and pesticides—has assumed increased importance during the last few years. The belief that much can be done to improve the effectiveness of this work has led the Piper Aircraft Corporation to form an Agricultural Development Division. A brief report on the work they have started appears on page 52 of this issue. Further information can be obtained by filling out the ***Reader Service Card.***

farm chemicals

Formerly
American Fertilizer & Allied Chemicals

Established 1894

PIONEER JOURNAL OF THE FARM CHEMICALS INDUSTRY

Vol. 114 **SEPTEMBER, 1951** **No. 9**

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Cover Story

Until the big, new ammonium sulfate plant was built for the Guanos y Fertilizantes near Mexico City, Mexican farmers found that much-needed chemical fertilizers were much too costly. In the part of the plant shown on this month's cover, purified natural gas is taken from the holder at left and put through the gas reform unit at right. There, it is reformed into a gas mixture that is 60 per cent hydrogen and 20 per cent nitrogen. This mixture is passed on to an ammonia rectifier where the gases are used to form pure ammonia. Finally, the ammonia is brought together with sulfuric acid to form ammonium sulfate.

Built by Chemical Construction Corporation, with Blaw-Knox as a subcontractor, the $10-million plant is the first of its kind in Mexico. The plant can turn out 50-tons of ammonium sulfate and 200-tons of sulfuric acid per day and has cut the cost of ammonium sulfate fertilizers from the import price of $93 a ton to $41 a ton.

—photo from Chemical Construction Corp.

A magazine international in scope and circulation and devoted to manufacturers, mixers, and formulators of fertilizers and pesticides

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K. F. WARE . . . . . Advertising Manager
YVONNE HOEVELER . . . . . Editorial Assistant

Advertising Representatives

Harold H. Short, Jr.
51 E. 42nd St., New York 17, N. Y. . . Murray Hill 7-6669
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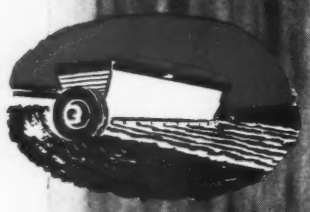

2. APPLICATION CONTROL—drills free and even . . . does not bridge over in the drill.

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Davison's Granulated Superphosphate with 3-way control can mean added sales for you!

No longer is it necessary for you or the farmer to worry about lumping or caking . . . Davison's Granulated Superphosphate will store without becoming hard or caked. And when the farmer starts to apply Granulated Superphosphate in the field he will find there is no dusting nor will it bridge over in the drill. Granulated Superphosphate drills freely and evenly giving complete coverage. Because of the granular structure, plant food is released at desirable rates.

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farm chemicals facts

. . . Briefly Noted

Now director for **Monsanto's** organic chemicals division is **Howard K. Nason.** Formerly assistant to the vice president in charge of research, development and patents, Nason came to Monsanto in 1936 as a research chemist. **John J. Healy, Jr.** has taken his former position.

California Spray-Chemical Corporation has a new plant at Decatur, Ala., for producing insecticides, fungicides, and weed killers. Manager of the plant is **C. M. Crutchfield.**

To be used for new applications research, **Barrett Division,** Allied Chemical and Dye Corporation has a $500,000 laboratory building scheduled for completion by the first of the year at Edgewater, N. J. Allied Chemical and Dye's **Solvay Process Division** has new pilot plant facilities worth $350,000 for work on fertilizers, nitrogen products, and synthetic organic chemicals at Hopewell, Va.

Died: Wilbur Judson, 71, senior vice president and a director of Texas Gulf Sulphur Co., in New York, August 9. He had been with the company since 1921.

St. Regis Paper Company has appointed **James H. McMillen** as Western District Sales Manager of the Multiwall Bag Sales Division. With headquarters at the company's Los Angeles office at 530 West Sixth Street, McMillen's area includes California, Washington, Oregon, Arizona, New Mexico and Nevada.

Sulfur production up, stocks down: U. S. sulfur producers reported 3,052,418-tons of native sulfur produced during the first seven months of 1951. This was a gain of about 43,000-tons over the corresponding period last year, but producers' stocks decreased and at the end of July stood at 2,669,635-tons. **NPA,** estimating a fourth quarter shortage of 100,000 tons of sulfur, promised a decision soon on the action it will take to overcome the deficit between the amount expected to be used and the tonnage to be produced. For more details, **see Industrial News Section.**

Park County, Wyoming, pest control board has re-established an old quarantine in a **fight against noxious weeds.** It requires every land owner to get a release from the county pest inspector before he can move seed or feed from his farm or ranch. He must certify his land is free from noxious weed seed as: Canada thistle, white lap, Russian knap weed, perennial sow thistle, leafy spurge and white rag weed.

Carl W. Peterson, assistant district sales manager in Chicago for du Pont's **Grasselli Chemicals** Department has transferred to the department's manufacturing division at Grasselli, N. J.

Noting that annual sales of insecticides in the Rio Grande valley exceed $5-million, while the rapidly expanding cotton area of the nearby Matamores region demands a similar amount, the Board of City Development, Brownsville, Texas (pop. 50,000), wants a top-grade **consulting entomologist** to come there and set up a private practice. The board says many farmers prefer to use an agronomist-entomologist on a retainer basis rather than depend on the part-time services of entomologists on the staff of commercial insecticide companies. Fees range upward from $1 per acre, depending upon the crop and the work required. Brownsville practice would also include Mexico after working arrangements were made in that country.

Died: Max Feinstein, president of the Star Fish and Bone Fertilizer Company, Bridgeton, N. J., on September 3.

Four new technical sales representatives have been added to **Pennsylvania Salt's** Agricultural Chemicals Department. **William T. Debusk** and **O. Harry Blanton** will make their headquarters at the district sales office in Montgomery, Ala. **James E. Murray** has been assigned to the Mid-West and will operate out of the company's new district sales office in Kansas City, Mo. **F. O. Swan, Jr.,** has been assigned to his native state of Texas and will make his headquarters at the district sales office in Bryan.

$25-million for expansion has been raised, through notes at 3 3/4 per cent maturing in 1972, by **Commercial Solvents Corporation,** according to a recent announcement by J. Albert Woods, president. Among the **expanded facilities** for which the money will be used are a new ammonium nitrate plant at Sterlington, La., and added capacity for making ammonia and methanol. Further expansion to increase output of agricultural products is under consideration.

Flag Sulphur and Chemical Company opened its new office in Tampa, September 17. Located at 72nd Street and the A.C.L. railroad, the company invites visitors. Mail address: P.O. Box 5737; New phone number: 4-2177.

The Phosphate Mines, Inc., north of Kemmerer, Wyoming, has completed the conversion of its facilities to the production of superphosphate. Matt Bertagnolli, company president, said the conversion involves chiefly the setting up of a 75-ton rotary kiln. Practically the entire output has already been contracted for several years by customers in Idaho, Nebraska, and adjoining states. The new product will have 22 per cent recoverable phosphate, Trona, lime, manganese, etc., for use as a supplemental livestock feed.

Phillip C. Hamm has joined **Monsanto** as a member of its agricultural chemicals section, organic chemicals division development department.

Industry members and NPA agree that about **125-million pounds** of technical **benzene hexachloride** will be needed next year, but industry says it can turn out that much. New facilities are responsible for industry's increased capacity. Biggest headache for producers: scarcity of steel drums and other containers. More details in **Industrial News Section.**

IMPORTANT ANGLE ON FARM PROFITS

The modern farmer relies a lot on plain old-fashioned sunshine to help tiny seeds and tender sprouts grow into bumper crops. But he knows he can't rely on sunshine *alone*.

Fortunately, there are many resources besides sunshine to help the farmer. In fair weather or foul, he can do much to improve the quality of his soil—and the size of his harvest —through the wise use of the right fertilizers.

Many of the most effective fertilizers are those compounded with potash—often with Sunshine State Potash, a product of New Mexico, and a soil nutrient which not only provides increased soil fertility, but also gives greater resistance to disease and drought.

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HIGRADE MURIATE OF POTASH
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48/52% K_2O MIN.
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UNITED STATES POTASH COMPANY, ***Incorporated,*** **30 Rockefeller Plaza, New York 20, N. Y.**

Freedom . . . tomorrow

During the recent celebration of the American Chemical Society's Diamond Jubilee, Dr. C. E. Kenneth Mees, director of research for Eastman Kodak Company, gave a talk about the "View Ahead in Chemistry." He gave an inspiring and awesome vision of the way in which chemists—some of them by observing the behavior of matter in far away stars—are quite likely to solve many of the problems that have perplexed mankind for centuries.

One of the things Dr. Mees expects the chemists of the near future to explain is the manner in which plants can, with apparent ease, turn simple elements into complex food substances. That the fertilizer and pesticide industry will be broadly affected by such expansion of our present knowledge, there can be little doubt.

"Perhaps one of the most serious problems for the chemists of the future," said Dr. Mees, "is that relating to the food supply . . . ." And then he gave a warning that must not go unheeded. ". . . it is no longer necessary for us to plead for the support of scientific research. Our work is in no danger of neglect, but it is quite seriously threatened by the possibility of interference and control."

Since the end of World War II, much has been said about the danger of controls. Among the most outspoken critics of government's increasing encroachment into the daily private and business life of free Americans have been men in the process industries of which the farm chemicals industry is an important part.

It is therefore surprising and somewhat disheartening to note a gathering trend among this very same group from industry. The trend started innocently enough. During times of national emergency, many able men have been called away from industry to go to Washington where they are given important posts in key defense and related agencies. On the surface, the idea of having business and industry regulated by men long familiar with their problems seems like a good one.

Trouble is, when they get to Washington, a number of these men seem more intent on establishing a personal record for "getting the job done," than they are in winning the really important, basic battle. That battle is, of course, to maintain the freedom of business to operate as a business and not as a relatively unimportant adjunct to some government bureau; just as it is the overall purpose of free men to remain free.

Not long ago we heard one of these industry men "on loan to the government" address a group of farm chemical manufacturers. He was there seeking support for an unpopular, unworkable, and undefinable program which he had been hired to "put across." You'll have to admit, he gave it that old college try. He wanted his program supported he said ". . . to guard ourselves and the free world from the forces which threaten our way of life." Like many of his Washington brethren he was pleading for more controls today, freedom tomorrow; with nary a word about more freedom today.

This particular defense official from the chemical industry also said, in part, ". . . I know it will be a happy day for you when we can throw controls out of the window. We can all speed that day by working together to speed along our defense program . . ."

But controls, once adopted, have a way of becoming "necessary" for an eternity. If they should become unpopular, the name can easily be changed to something with a sweeter sound; or a new "emergency" can be found that makes them once again "imperative to the national defense." There is nothing new in any of this. What is new—in America, at least—is the almost gleeful support this nibbling, weakening of industry is now getting from within industry itself. There is much industry can do about it.

What is needed now is a concerted program by industry to educate its own executives. Executives must be able to spot the elements of totalitarianism where ever they crop—or creep—up. Among executives, some required reading should be George Orwell's "1984"; the writings of Karl Marx, and a careful, dispassionate study of the way in which the present masters in the Kremlin grabbed and hold their powerful positions of complete domination over millions of people.

Any industry-sponsored program that would reaffirm industry's faith in itself, could not help but bring home one extremely important fact. That is, that our great industrial capacity is based upon filling the ever-present and growing needs of man living in peace with his neighbors and not—as many government officials apparently believe—upon war or the preparation for war. In such a program, the farm chemicals industry could well play the leading role.

Perhaps in no other industry can the unlimited peacetime needs of mankind be so easily shown as in the farm chemicals industry. For here in our industry are welded together the inseparable alliance between modern farming and chemistry, the world's most modern industry. If that can be shown so that everyone understands it, it will be an easy matter for the rest of industry to show that it, too, thrives most readily in an atmosphere of free enterprise aimed at fulfilling the peacetime wants of free men.

And if we are going to do this, we will have to do it soon. We may never get another chance.

—A. M. Brodine

LION provides one-stop nitrogen service to Southern fertilizer manufacturers

Lion Anhydrous Ammonia — Manufactured in Lion's modern plant to an 82.25% nitrogen content under accurate chemical control, the uniformity and high quality of this basic product are assured.

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Lion Nitrogen Fertilizer Solutions — Made specifically for the manufacturing of mixed fertilizers, these products supply both ammonia nitrogen and nitrate nitrogen in the ratios desired. They are easily handled and available in three types designed for varying weather conditions, and for formula requirements in the production of fertilizers that cure rapidly, store well and drill evenly.

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Lion Sulphate of Ammonia — This new, superior-type sulphate is guaranteed to contain a minimum of 21% nitrogen. Through special conditioning of the larger crystals, moisture and free acid content is greatly reduced. These factors, together with the special coating applied, make for greater resistance to caking in shipment or in storage. This product flows freely. It is shipped in bulk and in 100-pound, 6-ply bags laminated with asphalt.

"Serving Southern States"

Technical advice and assistance to fertilizer manufacturers in solving their manufacturing problems is available for the asking . . . just write.

LION OIL COMPANY

Chemical Division • El Dorado, Arkansas

farm chemicals outlook

Report from Washington
by Fred Bailey & Don Lerch

Key trends in Washington which may affect your business are beginning to show up in behind-scenes conferences. Top "command decisions" are forcing mobilizers to make decisions they have long been avoiding.

Prime defense production is lagging behind schedule when viewed on dollar volume of expenditures. Hoped-for rate of 5 billion dollars a month by the end of the year is becoming dim.

Mobilizers are privately talking about late '52 and '53 as the period of top production. Many observers here consider this as admission of both lagging schedules and increased defense goals.

Cuts in civilian production, considered by many to be long overdue, are finally being made. They are expected to continue until military production catches up to schedule.

DPA's new hard-hitting trouble shooter, Ralph Trigg, is plugging for agriculture's needs in spite of the political hazard of less civilian goods. Trigg, former PMA Administrator, is one of agriculture's strong voices in the "high court".

Senate Agriculture Committee pressure on NPA is expected to cushion NPA's raid on farm requirements. Tom Abernethy's House Sub-committee previously won two big rounds by challenging NPA on similar issues.

Both sulphur and steel will be subject to continuing review by Congress. Some members feel that continuing pressure will keep shortages to a minimum and spur farm production.

USDA estimates production of phosphates will be off 8 per cent during the fertilizer year just beginning. There is no basis for immediate relief in the opinion of many officials. Carry-over is small . . . tremendously inadequate in industry's opinion. Firm sulphur allocations are still hoped for . . . but not counted on to be of much help. New Louisiana production won't be available until 1953 . . . too late to ease Industry over the current pinch.

Even industry optimists are not counting on more than 90 per cent of last year's supply of sulphur and sulphuric acid. In perspective, the outlook is not bright, but it appears far less desperate than generally reported six months ago.

Strong action by the Atomic Energy Commission could substantially reduce the amount of sulphur available for production of normal superphosphate. Commission is eyeing increased supplies of uranium from "wet process" manufacture of triple-super. Such production requires about 10 per cent more sulphur per unit of P_2O_5.

Agronomists are worrying about the potential increase in demand for sulphur resulting from application of triple super in areas where soils are generally deficient. This area, including parts of the South, would require direct application of sulphur to maintain production.

USDA is fighting a rear guard action to protect producers of normal superphosphate in any deal with the Atomic Energy Commission. The Commission's expanded uses for atomic energy in planes, submarines, and new weapons puts the Department on the spot.

Industry complaints are finding their way into USDA offices where officials are forming new battle lines with NPA. The Department had hoped to concentrate on shoving through new tax amortizations for nitrogen production. Now they are demanding NPA grant firm allocations for the steel to honor the authorizations for new plants. USDA believes it will win, but says delays will cost food.

Luck is the term USDA uses in making long-range predictions for expanded nitrogen facilities. With luck, the Department hopes to see 600 to 800 thousand tons more fertilizer nitrogen in 1954-55 over current production. Not until then does the Department believe the production from proposed new capacity will be available to the farmer. This assumes no major increase in demand from the Army.

Morgantown nitrogen for agriculture is still viewed here as "iffy." Mathieson Chemical Corporation is reported ready to operate the plant at capacity, estimated by some at 180,000 tons of nitrogen per year with present production equipment. USDA hopes agriculture will get a fair proportion of this production, but officials are not certain how much the Army will take.

Potash production is estimated to be 13 per cent higher . . . though still short of demand.

Pesticide producers are worrying whether they can maintain last season's production record of a billion pounds of pesticides. Industry claims the plant capacity is there, but chlorine, benzol, alcohol, and other essentials may be lacking in required amounts.

Some industry observers fear the success of this season will dull mobilizers to the perils of big insect years. Both the corn borer and boll weevil flopped this year . . . many companies report only a fraction of anticipated business. Industry is trying to sell the claim that big supplies can fast turn into shortages in bad bug years.

Pesticides are becoming favorite "bait" in deals to spur lagging allies. DDT is the "magic powder" that reportedly gets favorable action fast. Watch for new calls for both Asia and Europe. Exports of both pesticides and fertilizers ""coincided" with the oil and Japanese Treaty negotiations.

Increased DDT exports are a definite part of Washington's plans during the next few months. Manufacturers are being warned to expect calls for at least 20 million pounds for export, possibly more. This would be a third higher than the previous rate of exports.

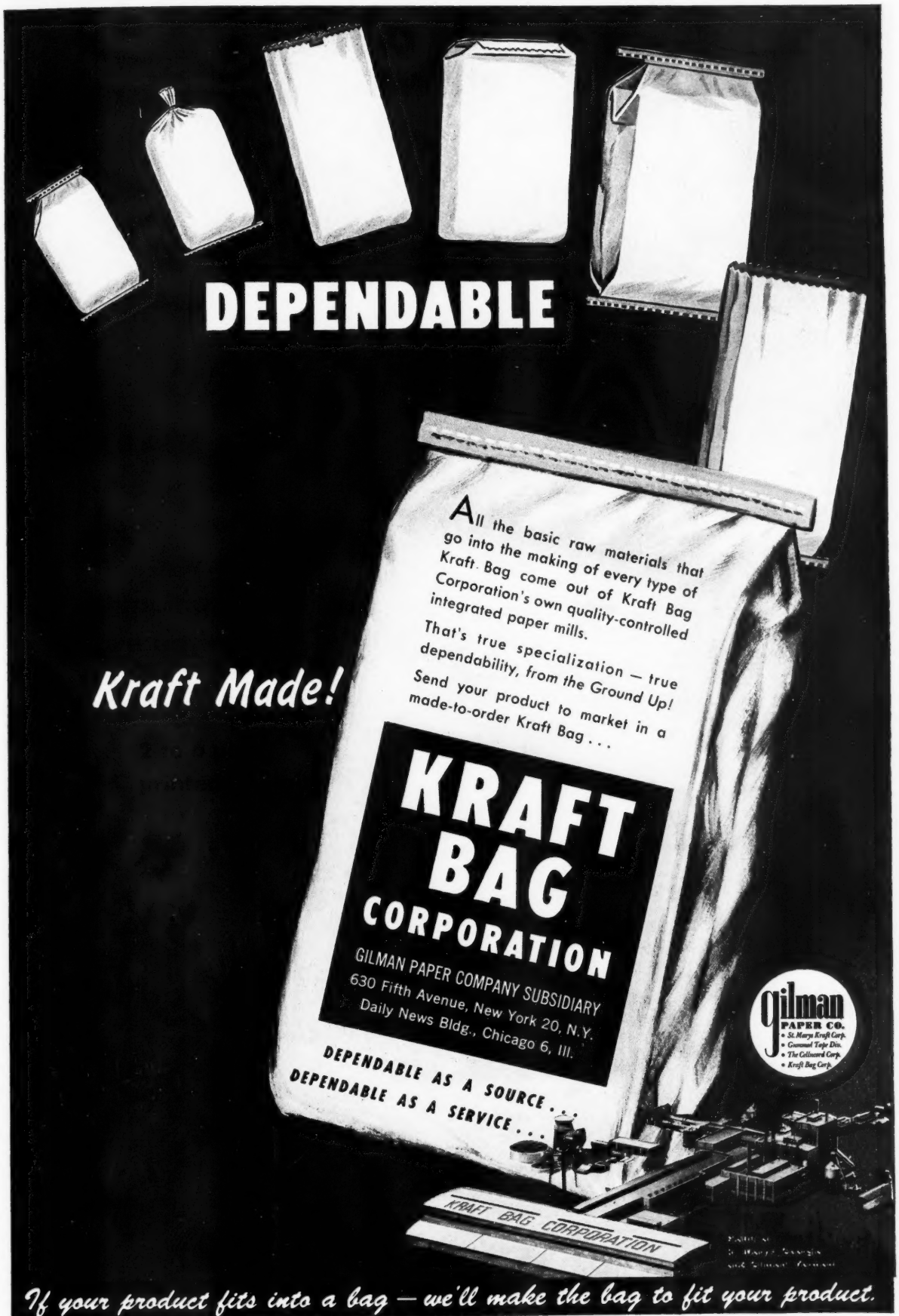
Mounting health and flavor problems are plaguing the pesticide industry. Latest move by the canners to speed research on physiological effect of pesticides catches pesticide makers in a dilemma. They fear that acceptance of the offer to support cooperative research with the canners would make them responsible for the flavors of processed food.

This could include not only off-flavors, but whether a pear sprayed with chemical X tastes as good as one sprayed with product Y. The chemical industry doesn't relish the thought of Congressional taste-testing committees . . . state preference might enter in.

Delaney Committee, investigating the safety of chemicals in and on foods is readying its trip to the West Coast states this fall if Congress adjourns in October. Since the Committee has "hit" the big magazines many observers expect a wind-up drive to ready more restrictive legislation.

Reorganization of BEPQ's research facilities is aimed at improving relations with industry. Randall Latta, acting leader of the new division, plans to make his office available to business men for discussion of research projects related to the production of dairy, bakery and other food products.

OPS ceilings on potash are generally regarded as helping the "smalls" compete with the four large producers in the industry. Series of fertilizer industry meetings with OPS is setting the stage for some price increases due to changes in formulations and higher freight rates.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Pesticide Producers Hold

18th Annual Meeting

Spring Lake Gathering Largest Ever

Staff Report

OVER 400 people attended the 18th annual meeting of the National Agricultural Chemicals Association, September 5–7, at Spring Lake, N. J. Under the stewardship of NAC's Executive Secretary, Lea S. Hitchner, the Association heard specialists in many fields discuss a wide variety of problems of major importance to the pesticide industry.

Among these discussions, in addition to annual reports by officers of the Association, were talks by government administrators and scientists from such key agencies as the Office of Price Administration, the National Production Authority, the Production and Marketing Administration, and the Bureau of Entomology and Plant Quarantine. The group was also addressed by leaders from industry, including officials of the Pineapple Research Institute of Hawaii, the Commercial Solvents Corporation, the Niagara Chemical Division of the Food Machinery and Chemical Corporation, the Raw Products Division of the National Canners Association, and the California Spray-Chemical Corporation.

During the talks by the various speakers, many facts about the farm chemicals industry were reported for the first time. One of these was that production of pesticides exceeded one billion pounds in 1951, a fact announced by Ernest Hart in his annual report as president of the Association. Exact figures could not be announced, Hart said, because of the "war weapons" status of pesticides at the present time. This year's production, Hart noted, exceeded preseason goals estimated by the Department of Agriculture.

Phillip H. Groggins, Chief of the Agricultural Chemicals Section, Chemical Division, National Production Authority, said that exports of DDT were scheduled to reach 20-million pounds next year. He also said that the pesticide industry can save from 50- to 80-per cent of the benzene and chlorine it is now using. Such savings, he said, are already underway in many plants. He also said that producers of DDT appear to be making every effort to conserve sulfur and sulfuric acid.

Defense Aims Cited

Defense agencies, according to W. R. Allstetter, Deputy Director of Materials and Facilities for the Production and Marketing Administration, USDA, are trying to keep federal controls on the pesticide industry at a minimum. To accomplish this objective, he said, required good information as to supplies and requirements.

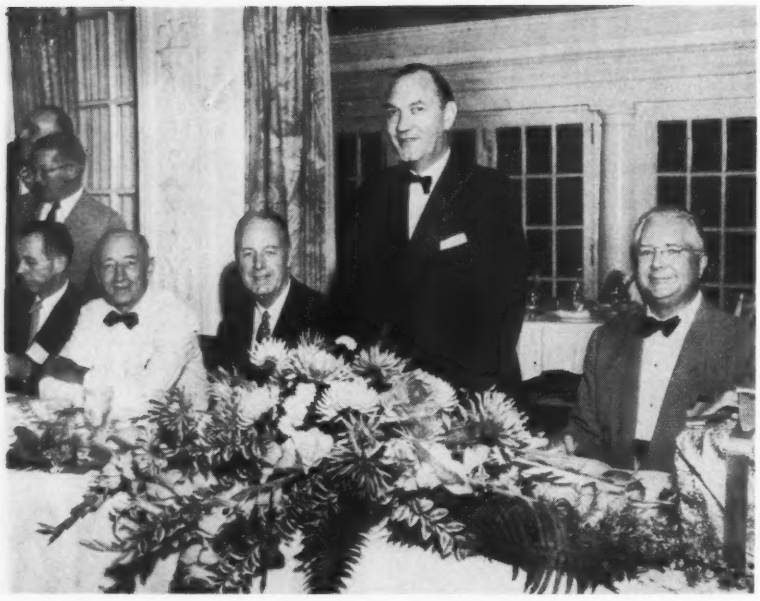
J. Albert Woods, president of Commercial Solvents Corporation, told the pesticide manufacturers that the chemicals industry is committed to a $4-billion expansion plan this year, topping steel's expansion plans by $800-million.

J. V. Vernon, vice-president of Niagara Chemical Division, Food Machinery and Chemical Corporation, announced the provisions of a cooperative research agreement between producers of pesticides and producers of application equipment. Vernon, reporting for the committee, gave the outline of an 8-point program for implementing the agreement.

Pesticide Limitations

Dr. H. L. Haller, Assistant Chief of the Bureau of Entomology and Plant Quarantine, USDA, told the conventioners that one of the most important problems confronting the pesticide industry today is a determination of the limitation of use of the various pesticides that have been developed during the past few years. Not only is it necessary, he said, to determine the effectiveness of a chemical against numerous pests, its compatibility with other pesticides, and the development of suitable formulations, but it is also necessary to know whether or not the chemical will injure plants, contaminate the soil and whether toxicity of the chemical to man and animals, including wild-life, presents a hazard in its use under prescribed conditions.

"Human population is probably the gravest problem of our time," quoted Firman E. Bear in his talk to the pesticide industry representatives. Quoting from the introduction of a recent book, "Human Fertility, The Modern Dilemma,"



At the speakers' table at NAC's 18th annual meeting are, left to right: John Paul Jones, Stauffer Chemical; George Leonard, Tobacco By-Products; J. Hallam Boyd, Commercial Chemical; principal speaker J. Albert Woods, president of Commercial Solvents; and Ernest Hart, Niagara Chemical Div.

Dr. Bear reported that world population, now estimated at 2½-billion, is increasing at the rate of 68,000 every 24 hours. This amounts to 25 million a year. The rate of population growth in the United States, according to figures quoted by Bear, is higher than the average for the rest of the world. Dr. Bear believes that the nation will have to rely increasingly on farm chemicals for the resulting increase in the need for food.

New president for the National Agricultural Association is Arthur W. Mohr, president of California Spray-Chemical Corporation. His election was announced September 7 following a business session of the Association. Mr. Mohr succeeds Ernest Hart, president of the Niagara Chemical Division, Food Machinery and Chemical Corporation.

Elected vice-president was Paul Mayfield, assistant general manager of the Hercules Powder Company, and Lea S. Hitchner was re-elected as executive secretary.

Re-elected to another term on the association's board of directors were: W. W. Allen, Midland Michigan; W. C. Bennett, New York City; J. Hallam Boyd, Memphis, Tennessee; Ernest Hart, Middleport, N. Y.; Lea S. Hitchner, Washington, D. C.; John Paul Jones, New York City; George F. Leonard, Richmond, Va.; Paul Mayfield, Wilmington, Del.; James McConnon, Winona, Minn.; A. W. Mohr, Richmond, Cal.; E. H. Phillips, New York City; F. S. Washburn, New York City, and Byron P. Webster, Bound Brook, New Jersey.

Hart Reviews Year

Reviewing the manufacturing year, which for the pesticide industry ended August 31, Hart said the Korean War and the threat of a global conflict challenged pesticide manufacturers "to produce more with less." Hart, as outgoing president of the Association, spoke at the opening session of the 3-day meeting.

The government, he said, wanted increased production, not only for control of bugs, blights, weeds, and rodents on the farm: "There was increasing need also," he said, "for the military services, for public health programs, and for exports to friendly nations seeking to control malaria and other insect-borne diseases of man, and to boost agricultural production."

Hart said industry's production effort was hampered by shortages of benzol, chlorine and other basic chemicals also vital to other defense programs, and by limitations in the supply of labor, containers and other elements of production.

To meet the growing demands on the industry, Hart said it had, in the last eight to ten years, "more than doubled" plants for manufacturing, formulating and warehousing. Geographical distribution of these facilities was said to cover "practically all agricultural areas of the country." Hart further reported "tremendous strides forward in industry research leading to the development of new insecticides and the improvement of old ones."

OPS Official Speaks

During his talk before the convention, Howard J. Grady, of the Office of Price Stabilization, told the group that OPS officials are aware of the problems of the pesticide business, but that OPS has its problems too. "They are gigantic," he said.

Remarking that never before—short of actual war—have we launched a defense program of such scope, Grady went on to point out the present rate of spending (which he placed at $35-billion a year) and the effect that inflation has had on the value of money collected through taxation for defense spending.

After discussing the general price regulations, Grady said that CPR-22 was issued to cover manufacturers, giving relief to those who had voluntarily held the line and now were being penalized. It was also intended, he said, to roll back prices of those manufacturers who had advanced prices beyond their "normal profit ratios."

"The effect of this regulation," Grady said, "upon the pesticide industry is difficult to determine exactly. However, it is obvious that there will be some variation in ceiling prices from manufacturer to manufacturer because the base period price, materials and labor cost—which determine the ceiling price—will be different for each company."

Because of the heavy accounting and administrative burdens imposed by the provisions of CPR-22, Grady announced that OPS has indefinitely postponed the deadline for filing under the price regulation. OPS is now busy, he said, applying the standards of the amendments to the original regulation.

William R. Allstetter, deputy director of PMA's Office of Materials and Facilities told how USDA arrives at its estimates of requirements for pesticides:

1. USDA specialists estimate national needs.

2. Each company, usually working through NAC, makes estimates in the case of major pesticides as to what that company could reasonably expect to distribute during the coming year. These figures are totaled for each pesticide giving the combined industry demand.

Beautiful orchid lei, flown in from Hawaii especially for the occasion, is presented to Mrs. Ernest Hart by Pineapple Research Institute's representative, affable Gus M. Oehm.

3. Technical specialists in each state make estimates of the following year's demands based on the previous year's usage. The combined figures give the national demand requirements.

Noting that good production and supply data were lacking up to last fall, Allstetter said that cooperative efforts between NAC, NPA and USDA improved the available information. As a result of the accumulated data, a number of situations warranting government attention became apparent. NPA, usually at the request of the Production and Marketing Administration, provided some relief.

Gratified with the way in which the 1951 estimated requirements checked out with actual usage, Allstetter said that unless someone comes up with a better system, PMA-USDA-NPA groups will work along the lines followed last year.

Allstetter reviewed the supply situation as seen by USDA for various farm chemicals as follows:

Sulfur: Critically short. Agriculture, the largest user, is bound to receive substantially less this coming year. Supply of dusting sulfur for 1952 will be definitely less than in 1951. Synthetic miticides, such as parathion and TEPP may be used successfully as practicable substitutes for dusting sulfur. Synthetic fungicides can replace sulfur in many cases. Officials charged with recommending pesticidal practices to farmers have been urged to write their recommendation for 1952 with due consideration for the sulfur shortage.

Containers: Steel container situation is not satisfactory at present. Industry, however, is approaching a relatively quiet season from the viewpoint of distribution, or it would be impossible to obtain an adequate supply of containers. Recent government orders drastically restrict the number of metal containers which may be used for all categories of pesticides, but it is hoped that these restrictions can be relaxed sufficiently to permit orderly distribution during the next active period.

Spray machinery has replaced dusting equipment in large areas. This requires increasing quantities of metal containers. During the coming year, NPA will replace PMA as the claimant agency for agriculture.

Wood's Address

During his address as guest speaker at the annual banquet, J. Albert Woods, president of Commercial Solvents Corporation, outlined the development of the chemical industry in relation to other large industries. Called by investment bankers a "growth industry," Woods said no one has yet challenged its right to bear that title.

"It is of more than passing significance that, following the great depression, the chemicals as a group had recovered all their losses by 1935, whereas manufacturing production, generally, took another two years to equal the predepression level.

"From 1939 to 1943, manufacturing production rose 136 per cent; chemical output increased 243 per cent. In 1950, according to Financial World Magazine, the output of industrial chemicals was 13 per cent above the wartime peak while manufacturing output was still 19 per cent below it."

"It is a provable fact," said Mr. Woods, "that, with the possible exception of military explosives, the industry's products are just as essential in peace as in war.

"There is a constant effort to produce new products, to find new uses for old products—to develop new processes, new raw material sources, better quality, lower prices —all of which contribute to greater markets and wider uses."

In commenting on the chemical industry's $4-billion expansion plan for this year, Woods said that it compares with roughly $5 billion invested by the industry in new plants and facilities in the five years following the war—a period which saw its total assets shoot up 60 per cent.

"While it takes teamwork on the part of all in every great enterprise and industry," continued Woods,

Here, A. W. Mohr, California Spray-Chemical, new president of NAC is congratulated by friend Ernie Hart, the association's past president.

"and while sales and production engineers and purchasing departments have made notable contributions to our progress—it is my opinion that the keystone in the arch of the chemical industry is research.

"It is research that has made possible the rapid progress that has been made in the field of pesticides. Never before in the history of agricultural technology have pesticides played such an important role as they have in the last five years. The phenomenal development of revolutionary new pesticides has accounted for the rapid advances associated with the industry. Growth will continue," he said, "because ample supplies of food, forage and fiber cannot be produced without them."

Cooperative Project

In announcing the cooperative agreement between producers of farm chemicals and producers of farm equipment, Jack V. Vernon gave the outline of an 8-point program to be followed by the joint committee representing the National Agricultural Chemicals Association, the Farm Equipment Institute, the National Sprayer and Dusters Association, the National Agricultural Chemicals Association, and the Bureau of Plant Industry, Soils, and Agricultural Engineering, USDA.

Each of the participants in the joint research program agreed as follows:

The Pesticide and Application Equipment Committee—

1. To contribute $8500 for the period July 1, 1951 to June 30, 1952, and such additional sums from time to time as may be mutually agreed upon.

2. To deposit contributed funds with the United States Treasury through the United States Department of Agriculture for expenditure on this cooperative research program in accordance with the Administrative Regulations of the Department of Agriculture.

3. That the contributed funds are to be used for the salary and traveling expenses of a qualified agricultural or chemical engineer with three or four years' experience, preferably in the field of agriculture, and for such clerical and stenographic assistance as may be required in his program. Any unexpected balance upon the termination of this agreement shall be returned to the Committee.

4. To provide an Industry Advisory Committee composed of a limited number of representatives of the member organizations to assist in the planning and conduct of the research covered by this agreement.

The Bureau of Plant Industry, Soils, and Agricultural Engineering—

1. To plan, direct, and conduct the research covered by this agreement, to assign necessary personnel and to supply essential equipment, facilities, and supplies as needed, exclusive of the contributions of the cooperating committee.

Mutual Agreement

1. That research conducted under this agreement will be planned and directed by the Division of Farm Machinery, BPISAE, with the advice and assistance of the Industry Advisory Committee.

2. All technical information derived from these investigations shall be the property of the Bureau of Plant Industry, Soils, and Agricultural Engineering to be made available through suitable publications and other media to the general public. One copy of all technical compilations, analyses, and reports derived from the program will be provided each member of the Industry Advisory Committee, to use in furthering the program and objectives of the project. No publication of these data or results shall be made by industry cooperators with the approval of the Bureau.

3. No member of or delegate to Congress or resident commissioner, and no officer, agent, or employee of the government, shall be admitted to any share or part of this agreement or to any benefit to arise thereupon.

4. The agreement shall become effective July 1, 1951, and continue until June 30, 1952, subject

NAC president Lea S. Hitchner looks on as E. H. Phillips, G.L.F. Soil-Building Service opens discussion of current problems of the pesticide industry. In the open forum meeting, many members addressed the group from the floor.

to termination upon ninety days' notice by either party. This agreement may be extended from year to year by mutual consent.

The agreement was signed by J. V. Vernon, for the National Agricultural Chemicals Association; C. D. Leiter, for the National Sprayer and Duster Association; S. H. Bear, for Power Sprayer and Duster Division of the Farm Equipment Institute; Robert M. Salter, for the Bureau of Plant Industry, Soils, and Agricultural Engineering: and F. H. Spencer for the Agricultural Research Administration.

Haller Explains Terms

During his discussion of developments relating to insect control, Dr. Haller said that there is a present tendency by some to confuse "toxicity" with "hazard." The two terms, he said, are not synonymous.

"Toxicity," Dr. Haller explained, "is the *capacity* of a substance to produce injury. Hazard is the *probability* that injury will result from the use of the substance in the quantity and the manner recommended.

"The inherent toxicity of a pesticidal chemical to warm-blooded animals may have little or no direct bearing on the final food hazard. Many of the toxic materials are applied at a time when the edible portion of the plant has not yet developed.

"Operational hazards," continued Haller, "are also extremely important and deplorable, but it should be recognized that farm accidents involving pesticides are insignificant when compared to farm accidents involving the use of mechanical tools. Statements that those responsible for the development of pesticidal products have not recognized adequately the need of safeguarding the health of the workers in the agricultural chemical manufacturing plants, the users of pesticides, and the consumers of the food products, are not warranted."

Numerous statements have been issued, it was pointed out by Haller, regarding the precautions to be taken in the handling and use of pesticides, both by government and industry. USDA is now assembling a comprehensive report on the studies that have been carried out during the past several years in the field of toxicology on the new insecticides, fungicides, and herbicides. The report will include the results obtained by the combined efforts of federal and state agencies in cooperation with commercial organizations on the effect of pesticidal chemicals on laboratory animals, livestock, fish and wildlife, beneficial insects and plants. The contamination of agricultural products with chemical residues is also considered in the report.

Still another activity reported by Dr. Haller to the conventioners is the work of the Interdepartmental Committee on Pest Control. This committee consists of representatives of the Department of Defense, the Federal Security Agency, the Department of the Interior, and the Department of Agriculture.

One of the problems with which the committee has concerned itself has been the development of suitable coined names for synthetic organic pesticidal chemicals having complex systematic chemical names. Fifteen names have been developed, most of which have found world-wide acceptance.

Haller spoke briefly on some organizational changes within the Bureau of Entomology and Plant Quarantine. Since the first of July, he noted, the Bureau has been conducting its control and regulatory operations and its field business activities through five regional offices to provide the best possible utilization of BEPQ manpower and equipment.

The five regional offices are located at Greenfield, Mass.; Gulfport, Miss.; San Antonio, Tex.; Berkeley, Cal.; and Minneapolis, Minn. Information as to the states that the regional offices are servicing may be obtained from BEPQ. Each of the regional offices is under the direction of a Regional Director who reports to the Chief of BEPQ.

During his talk before the agricultural chemicals group, Dr. Firman E. Bear reviewed the increases that have taken place in our population since Captain John Smith arrived, and then showed the effect that this has had on the need for chemical applications to plants and soils.

"When Captain John Smith first set foot on the shore of Virginia in 1607, the 1,903-million acres of land that now constitute the United States of America was inhabited by some 800,000 Indians. Each of these Indians had 2,400 acres of land at his disposal. Today, only 344 years later, our population is over 150-million and the amount of land for each person has been reduced to 12 acres. Over half of this is desert, mountain, lake, and swamp."

Dr. Bear described the development of mechanical power, the creation of erosion-prone conditions and the awakening of the idea of the need for conservation practices. By that time, however, most of our forests had been cut down, the soil's natural fertility had been lowered, and the need for commercial fertilizers became increasingly apparent.

By now, reported Bear, virgin fertility has largely been exhausted. "We are no longer satisfied with the yields that unaided Nature can provide. The modern goal is 100 bushels of corn, 50 bushels of wheat, 500 bushels of potatoes, 20 tons of tomatoes, and 5 tons of alfalfa hay an acre."

Minor Elements Needed

Bear then cited the increased need for minor elements along with standard fertilizer materials and lime. Various plants, in different soils, and widely varying climates have been shown to require boron, molybdenum, copper, manganese, zinc, cobalt, or iodine. "These minor elements," said Bear, "present some of our most troublesome problems." He reported one case in which a New Jersey farmer last year plowed under 45 acres of cauliflower that wouldn't produce heads because his soil lacked available molybdenum.

Bear sees the soils departments in our state agricultural colleges and in the USDA as official guardians of the nation's soil. "They are," he declared, "under obligation to leave no stone unturned to the end that our land is conserved and its productivity is raised to higher levels." ◆

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Sulfur In Crop Production

Dr. C. E. Millar

Professor Emeritus, Soils Science Department

Michigan State College

THERE IS no accurate record as to when the use of sulfur-containing materials for soil improvement was first practiced. Unquestionably they were used many centuries before de Saussure in 1880 demonstrated that sulfur is an essential element in plant growth, and although sulfur compounds continued to be used on the soil after de Saussure's discovery, for many years they were not applied with the idea of supplying sulfur. The years from 1760 to 1845 were designated by Alway[1] as the period of "Reign of Gypsum" because of the wide use of this material. Importations of gypsum into the United States during the early part of the nineteenth century are reported to have increased from 30,000 tons to 100,000 tons.

Reports of benefits arising from the use of gypsum were discredited by the field experiments of Boussingault who published a treatise in 1844 in which he devoted considerable space to the question. He showed that gypsum was of benefit to only a few plants, mainly clover, lucern, and sainfoin which are present in "artificial meadows" and not in natural ones. Boussingault also discredited the theory of Liebig that gypsum absorbs ammonia from rain water, and that of Davy who maintained that the ashes of clover were richer in sulfate of lime when the crop was grown on soil treated with gypsum.

Following Boussingault's work interest in the application of sulfur compounds to the soil waned. Undoubtedly, however, the rapid spread in the use of superphosphate following the beginning of its manufacture by Lawes in 1843, had much to do with the discontinuance of the use of gypsum. Whatever the cause, the fact remains that little was heard about sulfur applications until 1899 when the Russian, Bogdanoff[2] showed that plants contain more of the element than was indicated by the ash analyses of Wolff. Fraps called attention to the same discrepancy in 1900. Bogdanoff found the yield of white mustard to be greatly increased by additions of sodium sulfate to certain black soils of Russia. Field experiments by Dymond, Hughes, and Jupe[3] in Essex County, England, during the period 1896 to 1901 and published in 1905, served to confirm the ideas of Bogdanoff.

In 1911 Hart and Peterson[4] brought the problem forcefully to the attention of agronomists. Investigation of the sulfur content of soils was carried on by workers in many states during the next few years, and a number of field trials were started to determine the response of crops to sulfur applications. These investigations have continued until the present time and in fact a renewed interest in the sulfur problem has been evidenced in the last few years.

Sulfur Content of Soils

The sulfur content of soils in the humid areas of the United States is quite variable as is shown by the data in Table 1. The amount of sulfur in the soil varies with the content of organic matter as shown by studies at the University of Illinois[5] and the results of other workers. In soils of low to medium organic content the sulfur-carbon ratio appeared to be about 1:50 and the ratio widened with increase in organic matter. Rost and Evans[6] have shown that in Minnesota soils the percentage of total sulfur in organic form varies from 45.4 in the Podzols of the north central region to 73.3 in the Chernozems. Evidently there is no constant relationship between the sulfur and organic matter contents of soils. In Minnesota the percentage of total sulfur occurring as SO_4 varied from 2.8 in Chernozems to 7.9 in the Podzols in the north-eastern part of the state.

The amount of leaching to which a soil is submitted and climatic conditions which hasten the decay of organic matter influence the quantity of sulfur in soils. On the whole soils of humid areas do not contain large quantities of sulfur, the amount being appreciably less than the phosphorus content in most cases. This is not always true however, especially in virgin soils of the southeast. Analyses published by Marbut show considerably more sulfur than phosphorus in several soils. Also cultivation has been shown by several workers to rapidly decrease the supply of sulfur in soil. Table 2 presents typical results. It has been shown also by several investigators that the sulfur content of many soils in humid areas decreases decidedly below the surface or humus-rich layer. The data in Table 3 illustrate this fact. Exceptions to this result are found in some soils of the southeast.

Many soils in arid regions contain ample to excessive quantities

Table 1. Sulfur in Surface Soil

POUNDS PER ACRE

State	Maximum	Minimum	Average
Indiana	1,120	160	300–600
Ohio	1,112	362	680
Oregon	700	300	558
Kentucky	1,420	180	563
Iowa	1,233	441	815
Kansas	1,240	320	730
Texas	1,280[1]	256[1]	522[2]

[1] Averages for soils in a county. One soil contained only 80 lbs.
[2] Average for soils in 20 counties.

Table 2. Effect of Cropping on Sulfur Content of Soils

POUNDS OF SULFUR PER ACRE

State	Wisconsin	Kentucky	Kansas
Virgin soil	772	667	920
Cropped soil	416	486	540

Table 3. Sulfur Content of Surface and Subsoil

POUNDS PER ACRE

State	Oregon	Kentucky	Iowa	Kansas	Texas	Ohio
Surface	558	667	815	730	522	1056
Subsoil	409	464	376	600	492	528

Table 4. Sulfur in Precipitation

POUNDS PER ACRE

State	Maximum	Minimum	Average for Non-industrial areas
Indiana	127.1	20.0	27.0
Oklahoma	17.0	5.6	8.7
Texas	18.5	3.1	9.0
Minnesota	196.7	3.1	4.2
Tennessee	232.4	12.7	——
New York	77.5	38.2	——
Kentucky	41.2	17.1	24.1
Alabama	30.7	2.9	13.0

Table 5. Seasonal Variation in Sulfur Content of Precipitation

POUNDS PER ACRE

State	Jan.-March	April-June	July-Sept.	Oct.-Dec.
Oklahoma[1]	1.61	3.21	1.86	2.26
Alabama[2]	5.35	3.95	3.35	5.30
Georgia[3]	6.42	3.49	3.43	4.18
Mississippi[3]	3.41	2.89	3.47	2.70
Tennessee[3]	10.86	8.58	6.38	7.20

[1] 13-year average. [2] 12 locations. [3] 1 location.

of sulfur either in the surface or subsoil or both. This is not always true however, as is shown by Conrad[7].

Crop Requirement for Sulfur

Many data have been published showing the sulfur content of plants and the relationship between the quantities of sulfur and phosphorus in crops. Some of these sources are, Hart and Peterson[4], Fraps[8], Beeson[9], and Thomas[10], among others.

It is now well recognized that sulfur occurs in sufficient quantities in plants to classify it as a major rather than a minor or micro nutrient. Quantities are much more variable than are amounts of phosphorus. It has been stated that roughly, cereals contain around one-half as much sulfur as phosphorus, legumes contain as much and often more, and the cruciferae are much richer in sulfur than in phosphorus. It must be admitted that the quantities of sulfur removed in crops are significant considering the amounts contained in most soils.

Sulfur occurs mainly in the proteins of plants but also in volatile compounds such as mustard oil and allyl sulfide and as sulfates. It has not been shown whether the sulfates represent quantities in excess of plant requirements.

Natural Sulfur Additions to Soil

Rain and snow add more sulfur to the soil than any other natural agency. The sulfur in precipitation is derived from the atmosphere, which in turn is supplied through the combustion of fuels, from volcanic fumes, dust, and to a small extent, through decay processes. Accordingly the quantity of sulfur brought to the earth by precipitation must vary greatly within relatively short distances. Representative data showing additions of sulfur in precipitation are presented in Table 4. Seasonal variations in the sulfur content of precipitation are illustrated by the data in Table 5.

Recently Alway[10] has pointed out a source of considerable error in measurements of this kind. If the apparatus used to collect precipitation for sulfur analysis, is composed of metals which are

acted upon by SO_2, the quantities of sulfur obtained are abnormally high. Because apparatus of this nature has been used in the collection of precipitation in many if not most instances, we find ourselves without reliable data regarding the quantities of sulfur supplied through rain and snow. There is sufficient evidence, however, to warrant the conclusion that near industrial centers the quantities of sulfur brought to the earth from the atmosphere are considerable and may equal or exceed the removal of sulfur from the soil in crops. On the other hand soils far removed from cities receive very small quantities of sulfur from the air.

It has been shown also that soil is capable of absorbing sulfur gases directly from the air[11]. The data in Table 6 show that the quantity so absorbed varies with location (that is, with the SO_2 content of the air) and with the position or placement of the soil sample being used in the tests. It is doubtful if on the average, soils covered with vegetation a considerable portion of the year, which obstructs air movements, absorb any great amount of sulfur from the atmosphere.

Likewise it is doubtful if crops obtain more than a small fraction of their sulfur requirement by direct absorption of sulfur dioxide through their leaves. It has been shown, however, by several investigators that crops are capable of absorbing and utilizing sulfur from this source[12]. Furthermore it appears to be agreed that concentrations of around one part per million of SO_2 will cause some damage to plants especially sensitive to this gas and higher concentrations may cause defoliation.

Irrigation water is also the source of much sulfur in some cases, but not in all instances. The total land area receiving appreciable quantities of sulfur through irrigation is not large compared to the total crop land of our country. Locally, however, such areas are of much significance.

Response of Crops to Sulfur

As the result of field experiments a considerable number of states have found that on at least some of the soil types within their borders the yield of crops is increased

Table 6. Absorption of S from the Atmosphere by Soil and Lead Peroxide

POUNDS PER ACRE

Location	Time Months	Loam Soil	Lead Peroxide	Ratio lead to soil
Roof Soils Building, University Farm.	7	14.6	63.9	4.46
Bemidji.....	8		1.9	
Crow Wing.....	8		2.9	
Uni. Farm, 6 inches above ground....	2	3.0	6.2	2.67
Vermont (5 places).	12		4.36 to 17.96	av. 12.89
Minnesota (7 places).....	10		2.23 to 343.1	

Table 7. Sulfur Applied to Crop Land in Fertilizers

POUNDS PER ACRE

New England	Middle Atlantic	South Atlantic	E. North Central	W. North Central
19.46	**16.71**	**27.28**	**6.32**	**0.89**
E. South Central	W. South Central	Mountain	Pacific	
15.20	**3.49**	**1.14**	**6.48**	

Table 8. Need for Application of Sulfur in Different States

NUMBER OF STATES

Group 1 Not needed	Group 2 S in precipitation prevents a deficiency	Group 3 Would be needed if fertilizer were not applied	Group 4 Needed in addition to S in fertilizers and precipitation
9	**3**	**18** possibly **23**	**8**

Table 9. Groups of States with Varying Sulfur Needs

Group

1. Arizona, California, Iowa, Kansas, Nebraska, New Mexico, North Dakota, South Dakota, Utah.
2. Illinois, Kent, Tennessee.
3. Alabama, Arkansas, Connecticut, Delaware, Georgia, Maine, Massachusetts, Mississippi, Maryland, New Jersey, New York, New Hampshire, North Carolina, Oklahoma, Ohio, Pennsylvania, Texas, Vermont, and possibly Virginia, West Virginia, Wisconsin, Michigan and Rhode Island.
4. California, Florida, Idaho, Minnesota, Montana, Oregon, Washington, Wyoming.

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by sulfur applications. Legumes, and especially alfalfa responds to additions of sulfur more frequently than most other crops. Several workers, however, report a decreased yield of peas with too heavy an application of sulfur because of too great stimulation of vine growth. The cruciferae are also sensitive to a limited supply of sulfur. Several southern states report a response in growth of cotton. Some states find increased yields of most commonly grown crops following additions of sulfur. In Florida[13] the yield and protein content of grass following clover were increased as a result of the increased growth of the clover due to application of sulfur.

Some attention has been given to the effect of sulfur applications on the composition of crops. Dymond[3] *et al* report an increase in the sulfur and nitrogen content of several crops as a result of applications of gypsum. Shedd[14] found an increase in the sulfur content of soybeans as a result of sulfur application but not of protein.

It is possible that the effect of sulfur on the amounts of certain amino acids in crops is more important than the increase in total sulfur or of protein, from the nutritional viewpoint. Among those that are important in animal nutrition may be mentioned, cystine, methionine, and cysteine. More study is needed to determine the effect of sulfur addition on the content of sulfur-bearing amino acids and vitamins in plants grown on sulfur-deficient soils.

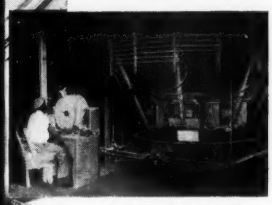
Application of Sulfur to Soils

Sulfur is returned to the soil in manures and plant residues. In so far as livestock are given purchased feed and bedding the sulfur in the manure from them will constitute an addition to the soil's supply. The sulfur content of manures will vary with several factors. Brown and Kellogg[15] found horse manure to contain 1.23 pounds of sulfur per ton, and cow manure 1.60 pounds. Kelly and Midgley[16] estimate that around 487 tons of sulfur are added to Vermont soils in manure produced from purchased feeds. The quantity of sulfur returned to the soil in manure varies greatly from state to state and also in different parts of the same state. Likewise the direct addition of sulfur to the soils of several states through the application of manure produced from imported feed, is a variable factor.

Unquestionably the application of fertilizer accounts for the largest addition of sulfur to the soils of many states. Mehring and Lundstrom[17] have presented the sulfur content of a comprehensive list of of fertilizers and materials frequently applied to soils. They show that complete fertilizers carrying from 12 to 20 per cent of the three nutrients N, P_2O_5, and K_2O, contain an average of 8.092 per cent of sulfur. Mixtures containing from 21 to 40 per cent of these nutrients supply 6.902 per cent of sulfur, and complete fertilizers with over 40 per cent total nutrients contain only 1.396 per cent of this element. Mixtures of nitrogen and potash contain insignificant quantities of sulfur (.14 per cent) and phosphate-potash mixtures carry 6.43 per cent. Applying these factors to the tonnages of the fifteen principal fertilizers used in the different groups of states for the year 1949–50 as given by Scholl and Wallace[18], we obtain the quantities of sulfur shown in Table 7.

These figures include the sulfur in superphosphate (18–20 per cent) and sulfate of ammonia applied alone, which amounts to an appreciable sulfur addition in several states. They do not include the sulfur in the fertilizers listed by Scholl as "all other mixtures". The tonnage of such mixtures is not great except in a few states, notably Florida and Georgia. The data therefore may be said to represent the minimum rather than the maximum amounts of sulfur applied in fertilizers. It is interesting to note that the sulfur applied in fertilizers per crop acre in the New England, Atlantic and East South Central states is sufficient to supply the requirement of very large crops of corn, wheat, oats, clover or timothy hay, and various other crops. In the East North Central, West South Central, and Pacific states the sulfur added in fertilizers is sufficient to make a major contribution to crop requirements on the total acreage of crop land. *(Please turn to page 46)*

SACKETT FERTILIZER PROCESSING SYSTEMS PAY OFF



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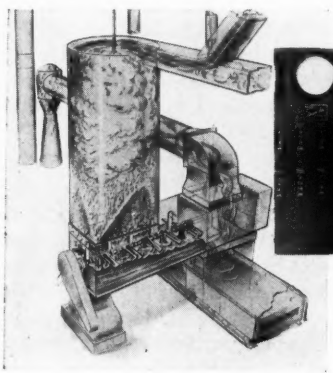

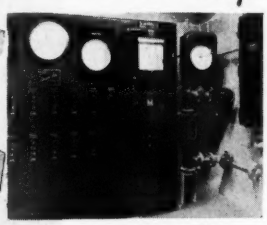

CONTROL PANEL
Central control panel shown above is nerve center of Super-Flo Process. Plant is operated from this point by one man.

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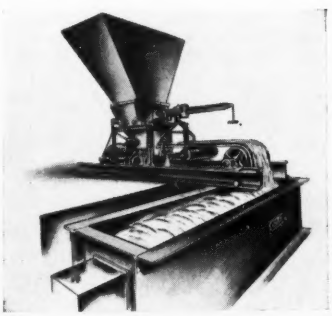

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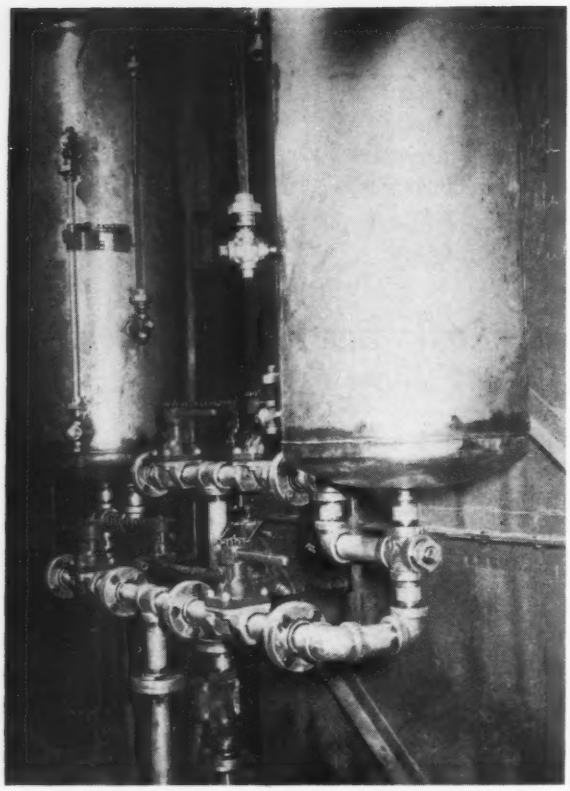


New Idea: Dual-acting nitrogen solution tanks.

Twin Mixing Tanks U

by M. H. Godbey

J. M. Tull Metal and Supply Co.

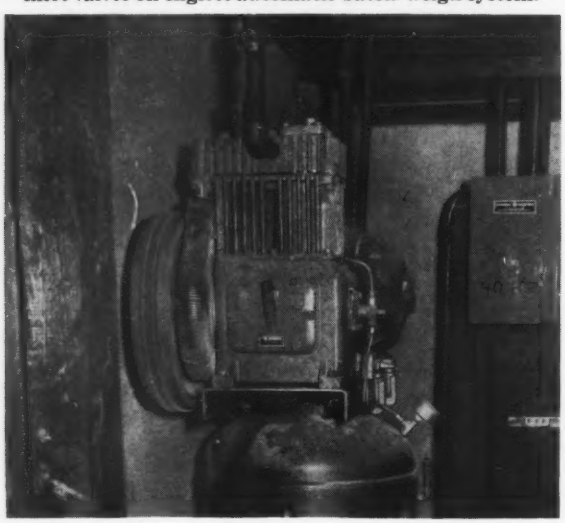
IN THE FIRST installation of its kind in the industry, tandem mixing tanks for transferring measured amounts of ammonia solution to the mixer have made possible the production of 60-tons per hour of complete mixed fertilizer from each one-ton mixer at the Etiwan Fertilizer Company of Charleston, S. C.

The installation was made with equipment supplied by the J. M. Tull Metal and Supply Company, who specialize in materials for handling nitrogen solutions, on the recommendation of F. N. Miller, technical service representative for Spencer Chemical Company. Miller was called in by the Etiwan company to help them solve a production problem. Mr. Miller says, "The problem was to increase production, yet keep to a minimum of 30 seconds the 'wetting time' for each batch. We did this without any increase in pressure on the tanks or the tankcars."

Many years ago, when nitrogen solutions were first used in the manufacture of fertilizer, many problems appeared in the transmission of the solutions from tank car to mixer. Until this detail was worked out to his satisfaction, no fertilizer manufacturer would purchase nitrogen solutions for use in his plant. Consequently, the chemical producer, unless he entered the supply field, was strictly "up against it" in trying to introduce nitrogen solutions to the industry.

At first, in an effort to use the then new fertilizer material, many a fertilizer manufacturer undertook his own piping work . . . often with disastrous results. He often selected pipe, valves, and fittings at random, overlooking the corrosive nature of the ammonia-bearing

Two-stage compressor forces solutions out of tank car or storage tank and also operates discharge and inlet valves on Inglett automatic batch-weigh system.



Tank cars used to haul nitrogen solutions are equipped with special valves and fittings to allow utilization of solutions without intermediate storage tanks.

Up Fertilizer Output at Etiwan Plant

Unique tandem measuring tanks with coupled valves increase capacity of one-ton mixer by 50 per cent

fluids they would be required to carry. Valves and gauge fixtures of brass or bronze were used and these rapidly deteriorated, with the result that the mixing plant had to be shut down frequently while repairs were made.

Speaking of this period, J. A. Naylor, vice-president of the J. M. Tull company, says, "About this time, we were called into consultation by one of the larger producers, with a view to standardizing all of the component parts needed to completely equip a plant, so that a prospective purchaser of solution would know just where he could obtain all of the necessary parts.

"Many years of research, of trial and error, were put into the project. Every type of valve was considered and trial equipment installed. Some components did a good job while others failed, and much time and money was expended before a fool-proof set of equipment could be announced."

As a result of such work, it was found that aluminum was far better than anything previously tried; and when aluminum pipe, valves, and fittings became readily available, the problem was licked.

The basic problem involved in the utilization of anhydrous ammonia, or any nitrogen solution, is relatively simple. It consists of emptying a tank car of solution into a storage tank and drawing from the storage tank, when needed, a measured amount of this chemical into a measuring tank and then, when required, discharging this amount into a rotary mixer. The latter is the machine in which the finished fertilizer is mixed to give the desired plant-food formula.

Nitrogen solutions can be moved most practicably from the tank car to the storage tank, from the storage tank to the measuring tank, and from the measuring tank into the mixer by the utilization of compressed air.

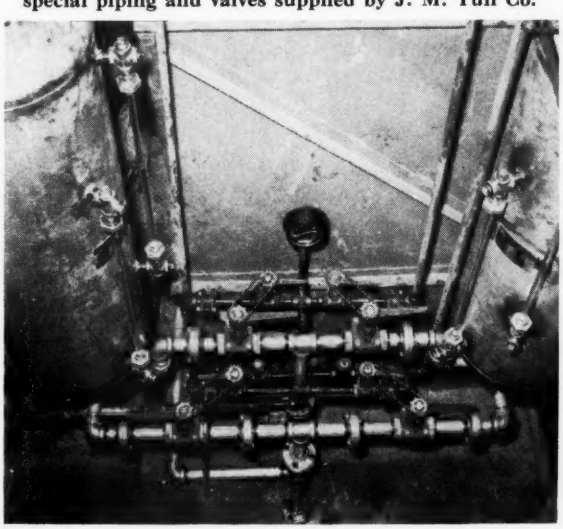
In using compressed air, every effort must be made to insure that none of the nitrogen compound or its fumes can get into the air lines or the air tank. It is doubly necessary to insure that none of the fittings, pipe, compressor, or any parts thereof, have any copper or brass brazing alloys of any kind in their construction.

The reason for this is that corrosion of brass and copper alloys in an ammonia atmosphere is rapid—and it can be expensive! The air lines for a fertilizer ammoniation or nitrogenization plant can be made of steel. The solution lines, however, should be made of aluminum alloys.

Aluminum or stainless steel should be the material used in the manufacture of the measuring tank, and in the fittings and valves that comprise the solution system. Where either of these two metals are used, there will be minimum maintenance or failure of any of the metallic parts.

Generally, if a fertilizer producer wishes to employ a one-ton mixer of standard design, and intends to produce from this mixer, fertilizer

Tanks work alternately by unique system of sprocket and chain-operated valves. Tanks are connected by special piping and valves supplied by J. M. Tull Co.



Nitrogen solutions from the twin measuring tanks discharge into this one-ton Atlanta Utility rotary mixer through aluminum piping installed along the floor.

at the rate of 40-tons per hour, one measuring tank with a capacity of 56½-gallons will suffice. Until the system described here was devised, if the producer wanted to increase his production to 60-tons per hour, he required a pump with which to increase the pressure in the ammoniation system.

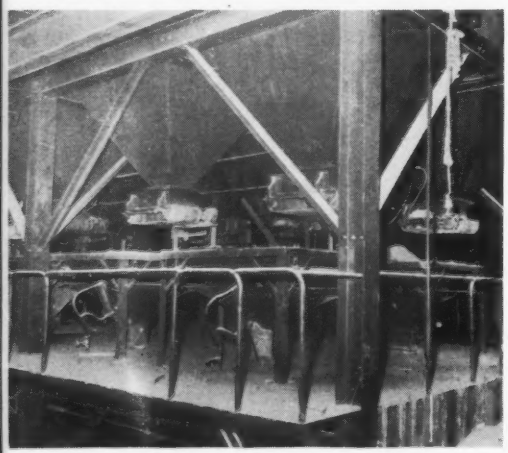
Problem Solved

Faced with such a problem, the Etiwan Fertilizer Company called in the technical field service man from the company which supplied them with nitrogen solutions. That was the beginning of the dual solution tanks now in operation at the Charleston, S. C., fertilizer plant.

Previously, the Etiwan company had installed a 60-ton per hour Inglett automatic batching system equipped with pneumatic controls for charging and discharging their one-ton Atlanta Utility Mixer. Naturally, unless the capacity of the measuring tank could be stepped up to equal the capacity of the batching system, it would be impossible to take full advantage of the new equipment.

Spencer Chemical sent their technical service representatives, Mr. Miller and Mr. H. B. Davis to look over the situation in the light of requirements laid down by the Etiwan company. Initial conditions included the stipulation that the "wetting time" be maintained at not less than 30 seconds for each batch of fertilizer processed in the mixer. This is necessary because the time required to fully wet a batch of phosphate rock in a one-ton mixer is at least 30 seconds.

Material for ammoniation is sent by belt-conveyors to the mixer through this 60-ton per hour Inglett Automatic batch weighing system. Visible on bottom hoppers are the air-operated discharge units.



Dual solution tanks occurred to the technical service men as the answer to the problem. Using tanks and fittings supplied by the J. M. Tull company, they installed two tanks in tandem in the nitrogen and air supply lines. No increase in operating pressure was needed, and the mixing tanks were vented directly into the mixer. This was done so that while one tank is being discharged into the mixer, the other is being filled, thus insuring that all ammonia gas is vented into the mixer.

No additional controls for the operator are needed, as air and solution valves are hooked by a chain and sprocket drive. All controls to batching and ammonia systems, including the pneumatic mixer-controls are installed within easy reach of the operator who has a clear view of plant operations.

Miller and Davis managed to pack all the ammonia equipment into an overall space 78-inches wide, 20-inches deep and approximately 10-feet high.

The two measuring tanks were suspended from an H-beam on 59-inch centers by ¾-inch rods with jam-nuts for vertical adjustments. Solution and air lines were brought in between the measuring tanks, and ammonia flanges were used throughout the installation. This was done to allow any line or short section to be disassembled quickly in case the solution should "salt," or moisture should freeze, or the air lines should clog from other causes.

Inlet solution valves, air-vent valves, discharge solution valves, and air-pressure valves were arranged in pairs, and the valve-pairs installed level and on parallel lines. Sprockets were attached to the top of each valve and each pair joined by sprocket chains. This arrangement makes possible the operation of all air valves simultaneously with the operation of the solution valves. The two tanks are operated with the same hand movements as a single-tank installation.

Already ultra-modern in its operating equipment and methods, the Etiwan Fertilizer Company has discovered that many benefits result from the use of the dual-tank system. Among these are: (1) An adequate supply of solution for 60-tons per hour operation in a one-ton mixer. (2) An adequate supply of solution with a low pressure of 25 pounds per square inch on the tank car to the storage tank. (3) A 30-second minimum discharge time of solution into the mixer. This gives an even wetting of superphosphate with the ammonia solution. (4) Even ammoniation makes bag-set less likely. (5) There is nothing new for the operator to learn. (6) All equipment is easily repaired locally. (7) Materials for repair and replacement are available from stocks on hand at the supplier, in this case, the J. M. Tull Metal and Supply Company. (8) The measuring tank being refilled with ammonia solution is vented into the mixer at the same time that the companion tank is discharging into the mixer.

Cost of the tandem tank installation for the average fertilizer plant is estimated to be, roughly, in the neighborhood of $1500. The supplier says this compares favorably with a stainless steel pump, including installation charges for the pump.

How to Buy Set-Up

Usually—and, as it happened in this case—this type of equipment is purchased through the representative of the fertilizer solution producer. Fertilizer manufacturers, in considering the purchase of nitrogen solutions, want to know where they are going to get the equipment, how it will be installed, and who will supervise the installation. As a rule, the sales-engineers of the company selling the solutions—in the present instance, Miller and Davis of the Spencer Chemical Company—are quite willing to install the equipment as they, of course, are anxious to see to it that their customer has a trouble-free ammonia system.

Thus, through careful analysis, ingenuity, and cooperation between manufacturer, supplier, and basic producer, another technique has been added to the long list of know-how required in the production of the chemicals needed for farming.◆

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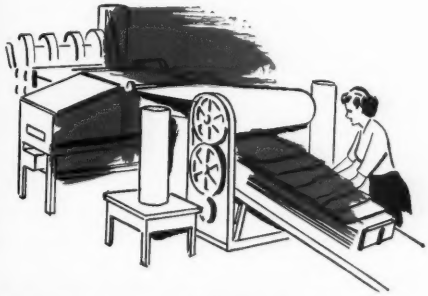

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How Small Plants Can Raise More Capital

Ernest W. Fair
Associated Business Writers of America

THERE COMES a time in every executive's experience when he ardently wishes he had more capital to take advantage of current opportunities and speed up the growth of his business. Getting such capital is not always easy.

Yet there are many ways in which an established farm chemicals plant of reasonably sound structure can go about obtaining such additional funds without sacrificing control of the organization.

Wherever possible, the most advantageous way of increasing capital funds is through the sale of subordinated debentures rather than issuance of additional stock if the plant is incorporated. And it may be noted that many avenues toward obtaining new capital are open to incorporated farm chemicals plants that are closed to sole ownership or partnership operations.

Subordinated debentures are used in finance company operations, particularly at local levels and by large organizations. Their principles can be applied to smaller plants. They provide a borrowing base equal to that of preferred stock and have a very big advantage over the latter in that interest paid on these debentures is a deductible item for tax purposes. Preferred stock dividends are not. They are generally readily salable, less complicated to use, and quickly can be called should the need for this working capital pass.

Such debentures are generally sold to insurance companies and other investors of a like nature. Sometimes they may be sold through a local investment broker. Their possibilities as a capital working tool for any executive are such that it will pay him to discuss marketing possibilities of such debentures for his own firm with a local broker when he is considering the advisability of obtaining additional capital for his business.

Most experts advise that good marketability of such debentures can be enhanced when issued under a Trust Indenture to a local bank. The cost is small and a financial service well justified. Such an arrangement will call for limitations of amount in keeping with the net worth of the firm.

In the market today such debentures can generally be sold, when backed by a Trust Indenture with a local banking institution, at between four and five per cent. They should be callable on option of the issuing firm. Most are of ten-year maturity.

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Another common method of increasing capital in small plant operation is the issuance of preferred stock (the common stock being management-owned and containing control). Such preferred stock generally calls for a five or six per cent dividend rate. It is more expensive to use than debentures but if the firm has a stable record of growth and financial solidarity preferred stock is much easier to sell.

It is also to be noted that in any such program it will be well to have legal advice since securities laws in every state are peculiar to that individual state and the national regulations alone are not sufficient.

Capital expansion can always be obtained by the sound firm with the aid of loans from banks. Banks have different policies and different approaches in evaluating credit but there are some established principles used by all banks with which the executive should be acquainted. It is also worthy of note that while a small local bank may find itself unable or unwilling to handle the projected executive's loan, a nearby larger city bank may be very much interested in financing the project. Rejection of a plan by one's local bank should not exhaust the possibilities in any case.

In appraising a loan, the banker will closely examine the caliber of the management of the firm; he will look into such factors as honesty, character and general reputation and he will give much attention to past performance, particularly on personal or business loans. The banker's interest in the security of any loan is paramount but his interest in the past performance and integrity of the executive seeking that loan is very close behind.

Any such loan application for business expansion should be accompanied by an analysis of the proposed expansion, how it will affect the farm chemicals business as a whole in the area, the competitive situation in the area, and detailed use to which the funds are to be put.

No matter what program of capital expansion is embarked upon it is seldom wise to undertake the program unless full control of the operation and management of the firm is retained by its present owners. Permission of too many governing clauses concerned with the management of the firm in any type of loan agreement may so hamper future operations of the firm as to make the expansion a most unprofitable venture.

It will be difficult to obtain any extensive loan without some provisions entering into the agreement. If at all possible these should be limited only to protection of the loan through posting of assets of the firm as security for the loan. Any control over management granted should be only of a very limited nature.

The present tax situation makes growth from earnings of the firm a more and more difficult proposition each year; future capital must come through other means. ◆

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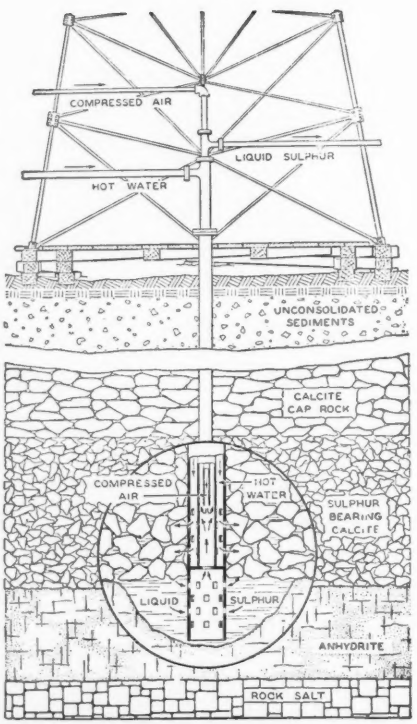
SULPHUR

*Interesting Facts Concerning This Basic Raw Material from the Gulf Coast Region

*WELL PIPING

The well equipment consists of pipes of various sizes, placed one within the other and extending from the surface into the sulphur deposit. A 10″ or an 8″ casing extends to and rests on the top of the cap rock. A 6″ pipe, inside the casing, passes below it and reaches into the barren anhydrite. It is perforated at two different levels, separated by an annular collar. The upper set of perforations permits the hot water to enter the sulphur formation and the lower set permits the entrance of the molten sulphur to the discharge pipe fitted inside the 6″ pipe.

When a well is "steamed" the hot water passes down the annular space inside the 6″ pipe and outside the sulphur pipe and flows through the upper set of perforations into the porous formation. The entire mass through which the hot water circulates is raised to a temperature above the melting point of sulphur. The liquid sulphur being heavier than water, makes its way downward to form a pool and displaces water around the foot of the well, and rises in the well column through the lower perforations into a 3″ pipe which is the sulphur discharge pipe. Compressed air released at the bottom of still another pipe fitted inside the 3″ pipe rises and mixes with the sulphur column, forming an air lift which raises the liquid sulphur free of water to the surface.



Loading operations at our Newgulf, Texas' mine

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Mines: Newgulf and Moss Bluff, Texas

FERTILIZER MATERIALS MARKET

New York

September 24, 1951

Sulphate of Ammonia

Demand increased for this material and while some small mixers are not in a position to take material in at this time, mills are shipping as fast as material is produced by eager buyers. No price changes noted.

Nitrate of Soda

No price changes noted and demand is routine with present stocks adequate to supply expected demand over the near term.

Ammonium Nitrate

Producers are making shipments as fast as production permits with available supplies being readily taken by buyers. A possible shortage is looked for in certain sections before the end of the current fertilizer season.

Nitrogenous Tankage

With production off in most cases, producers are reluctant to offer any material except to regular contract customers and demand continues excellent.

Castor Pomace

This material was in demand with last sales made at $37.25 per ton, f.o.b. production points, with no material being offered at present.

Organics

Organic materials displayed a mixed tone during the past week. After a sharp rise in vegetable meals during the early part of September, a declining tendency was noted in soybean meal the past few days, particularly for the future positions. Soybean meal for immediate shipment sold at the ceiling price of $74.00 per ton, f.o.b. Decatur, Ill., and has now declined to $64.00 per ton. Cottonseed meal was less firm than two weeks ago and linseed meal has about reached a top of $68.00 per ton for 34 per cent material. Tankage and blood were strong with last sales of blood made at $7.50 per unit of ammonia ($9.12 per unit N), and tankage sold at $7.75 per unit of ammonia ($9.42 per unit N).

Fish Meal

Menhaden fish meal was difficult to locate for immediate shipment because the fishing has been poor most of this season. Producers still have a number of contracts to fill and it is questionable at this time if they will be able to fill them. Last sales made at $135.00 per ton, f.o.b. eastern points.

Hoof Meal

Demand picked up for this material with last sales made on the basis of $7.25 to $7.50 per unit of ammonia ($8.82 to $9.12 per unit N), according to location of the production point.

Bone Meal

This material has enjoyed an excellent demand from both the fertilizer and feed trade and some producers are now sold out, with last sales made on the basis of $67.50 to $70.00 per ton, f.o.b. production points. A considerable amount of imported bone meal has recently been sold.

Low Grade Organics

While no shortage so far is apparent in this class of material, buyers recently have shown more disposition to pick up available offerings.

Superphosphate

This material is being advanced effective October 1st at several production points about 6 cents per unit. New prices are 82 cents per unit, f.o.b. Carteret, N. J., for the 20 per cent material. This increase is due entirely to higher production costs. Triple superphosphate still continues in active demand.

Potash

Foreign material continues to arrive at various Atlantic ports to augment the supply of domestic material. Some domestic producers made necessary plant repairs in August but are now said to be back on their regular shipping schedules.

Philadelphia

September 24, 1951

The materials market continues quiet with inorganics reported in tight supply. Organics, however, are not scarce, but prices are higher. While phosphoric acid during the coming season may be in shorter supply than last, it is expected that nitrogen and potash will be ahead, though probably not sufficient to meet requirements.

Sulphate of Ammonia.—This continues in nominally strong market position, and while the supply is reported scarce there are frequent second-hand offerings of domestic, and considerable foreign material. Prices run $45.00 to $50.00 per ton.

Nitrate of Soda.—No price changes are indicated and the demand is being well taken care of.

Blood, Tankage, Bone.—The organics market is considerably stronger, with blood and tankage quoted as high as $7.50 ($9.12 per unit N) in the East, and $8.50 ($10.33 per unit N) in the West. Bone meal is stronger at $67.50 per ton for raw and $70.00 for steamed.

Castor Pomace.—No offerings are in the market at present, due to scarcity of raw material. Last price was $37.25 per ton in bags.

Fish Scrap.—This is stronger with menhaden meal, 60 per cent grade, at $130.00 to $135.00 per ton, and scrap $125.00 to $128.00. The recent catch is reported not too good.

Phosphate Rock.—Market remains firm with domestic shipments confined principally to contract consumers. Pressure for deliveries is quite satisfactory, considering the uncertain situation in the superphosphate trade.

Superphosphate.—Shipments are being made mostly to regular contract customers, with the supply position reported tight. Price increase is thought quite likely later in the year.

Potash.—Demand is well ahead of domestic supply and deliveries are being made from production.

While this is in excess of last year, it will still not be sufficient to satisfy requirements. Ceiling prices are reported having been put on muriate.

Charleston

September 20. 1951

The shortage of superphosphate is of prime interest to the fertilizer mixers and the dry mixers are finding it difficult to obtain the supply they expect to need. Indications are that nitrogen also will tighten in supply. Imported muriate of potash is moving in fair volume where it is economical to use it, but Midwestern buyers, it appears, may be somewhat short in supply as they depend largely on domestic sources.

Organics.—Rather little activity is noted in the market on fertilizer organics as the producers of domestic nitrogenous tankage are heavily sold and not offering at present. Last sales made for domestic nitrogenous tankage were at $4.25 to $4.90 per unit of ammonia ($5.16 to $5.95 per unit N), bulk, f.o.b. origin. Imported nitrogenous is nominally $6.00 to $6.25 per unit of ammonia ($7.29 to $7.59 per unit N), in bags, c.i.f. Atlantic and Gulf ports.

Castor Pomace.—Production continues limited and current market is $37.25 per ton in burlap bags with an allowance of $2.00 per ton is shipment is in paper bags. Price is f.o.b. Northeastern production point for material guaranteed minimum 6.75 per cent ammonia.

Dried Blood.—Chicago market on unground bulk dried Blood is $7.75 to $8.00 per unit of ammonia ($9.42 to $9.72 per unit N) with the New York market quiet at around $7.00 to $7.25 ($8.51 to $8.82 per unit N).

Potash.—Production continues at normal levels and movement steady to fertilizer manufacturers. No change in prices has been noted recently.

Ground Cotton Bur Ash.—Offerings of this form of potash, primarily carbonate of potash, are in the market for prompt and future shipment. Material available from the most reliable producers tests approximately 40 per cent K_2O and prices approximate cost of domestic sulphate of potash on a delivered basis.

Phosphate Rock.—Export shipments during July and August have reduced stocks at the mines. Market position is firm and movement steady to domestic consumers.

Sulphate of Ammonia.—Supplies continue tight with shipments being made as soon as produced. Prices continue unchanged at $40.00 to $45.00 per ton, bulk, f.o.b. coke-ovens.

Superphosphate.—This market continues exceedingly tight and sulphuric acid remains the governing factor in production. Prices continue at ceiling levels.

Ammonium Nitrate.—Demand continues well in excess of supply and the market is described as exceedingly tight.

Nitrate of Soda.—Demand is in seasonal dimensions. Stocks apparently are adequate. No change in prices has been noted.

Wilson and Toomer Hires Top Consultant, Sets Up Centrally-Located Service

Perhaps one reason the Wilson and Toomer Fertilizer Company is so successful (plants at Jacksonville, Cottondale, and Tampa with a total annual capacity of 285,000 tons, and an insecticide division, the Florida Agricultural Supply Company, also at Jacksonville) is this: They provide their customers and agriculture as a whole with professional services of the highest possible quality and make those services readily available to the largest possible number of agriculturists.

An example of the company's policy in this regard is seen in their recent appointment of Dr. R. K. Voorhees as company horticulturist and the establishment of a centrally located office for him to work in.

Dr. Voorhees, who has been affiliated almost continuously for the past twenty years with the University of Florida Agricultural Experiment Station system, has conducted many investigations and spent years of research on problems involving soil nutrition, plant disease, pest control, drainage and irrigation.

For eight years following his graduation from the University of Florida in 1931, "Dick" was assistant plant pathologist at the Florida Agricultural Experiment Station at Gainesville. For five years he served as associate plant pathologist at the Lake Alfred Citrus Experiment Station, and before joining the Wilson and Toomer Company, was associate horticulturist at the Indian River Field Laboratory, at Fort Pierce, Fla. Originally from Minneapolis, Voorhees earned his Ph.D. from the University of Minnesota.

Wilson and Toomer's Vorhees

Wallace B. Hicks, president of Wilson and Toomer, said that Dr. Voorhees will establish an office and make his home in Orlando, Florida.

"By operating out of the central part of the state," said Hicks, "we believe that Dr. Voorhees' professional services will be more readily available to a greater number of agriculturists than if he were stationed in Jacksonville.

"Already, Dr. Voorhees has contributed enormously to the improvement of agriculture, and particularly to citrus growth, in Florida. We consider ourselves most fortunate in obtaining the services of a man of such calibre and experience as Dr. Voorhees. In the future, his services will be available to many more agriculturists than heretofore and I am confident that his work will be beneficial to the entire state."

Voorhees succeeds the late Dr. B. R. Fudge. ◆

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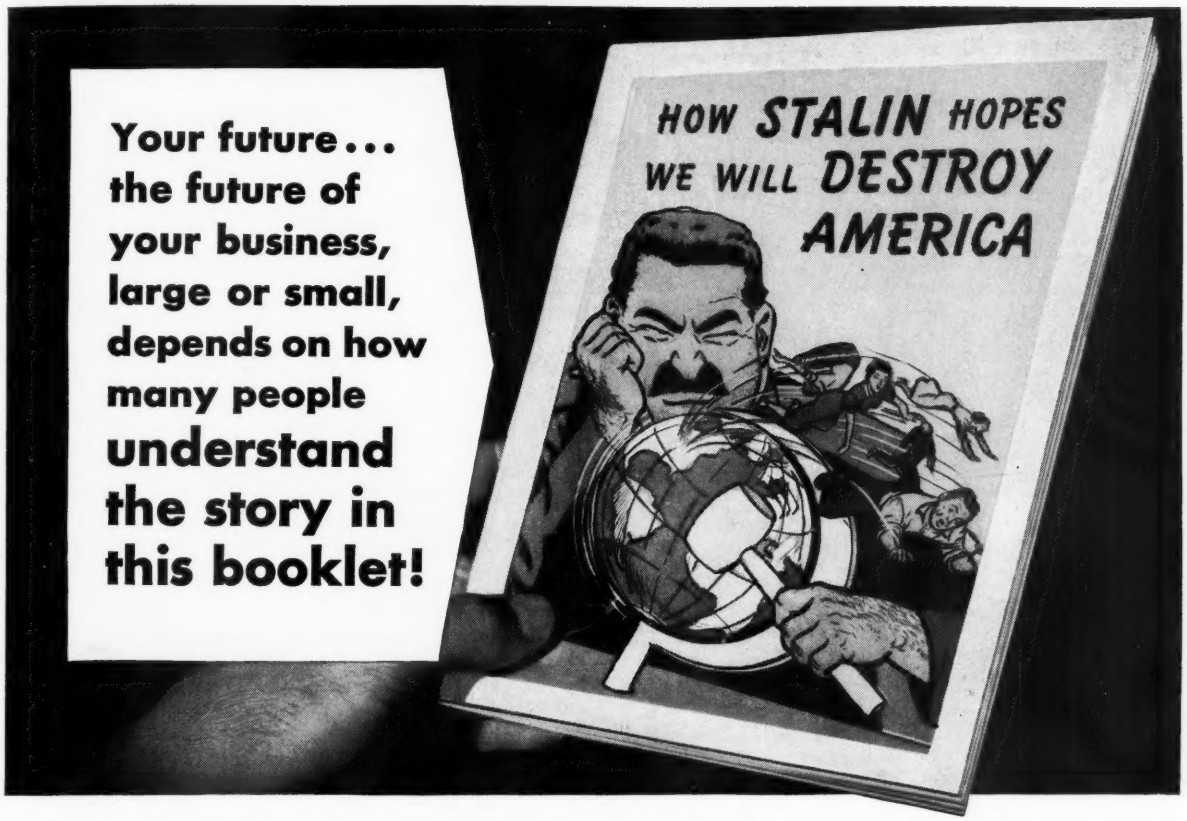
Your future... the future of your business, large or small, depends on how many people understand the story in this booklet!
HOW STALIN HOPES WE WILL DESTROY AMERICA

Businessmen recognize ***inflation*** *as the nation's greatest single threat. But most of us have felt "What can one man—even one business—do to stop it?"*
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ONE TOOL YOU CAN USE: To help us give our own Bemis workers the inflation picture, we used the colorful, new 16-page booklet "How Stalin Hopes We Will Destroy America" produced by Pictorial Media, Inc. The more widely the booklet is used, the more good it will do . . . and it is available for distribution to your workers, too. It follows the time-proven "comic book" technique . . . dramatizes the dangers . . . and shows how all our citizens can help halt inflation before it's too late.

TESTS SHOW IT HELPS WORKERS: To get an impartial judgment of the value of "How Stalin Hopes We Will Destroy America," it was tested in Bemis plants by the Psychological Corporation under the direction of Dr. Henry C. Link, a foremost research authority. Dr. Link says "Those workers exposed to the booklet were found to have a significantly higher appreciation of the recommended ways to stop inflation than did the workers who did not see the booklet. Details of this test are available upon request." And Bemis factory workers make such statements as "Everything it says hit home, but you'd never figure it out for yourself until you read it"...."It's told in an interesting way so anyone can understand. My daughter, age ten, understood all of it"..."In picture form it impresses you more. Most people don't read about it"..."Had ideas that we wouldn't think about otherwise while we are working away—good book, agree with it—I guess I won't be the only one."

Because we believe this message is growing more urgent every day, Bemis is taking this means to commend to other businesses this weapon against inflation. It is the first of a series of such material that we expect to use.

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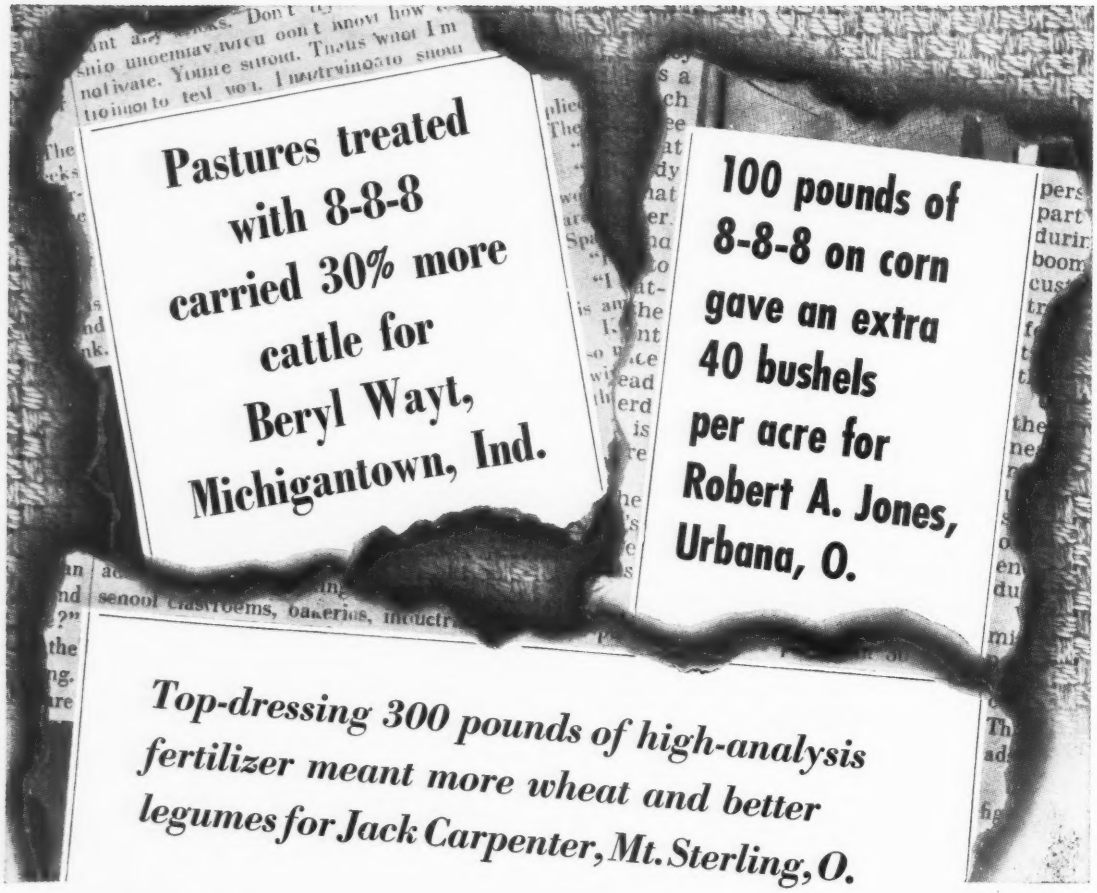
Pastures treated with 8-8-8 carried 30% more cattle for Beryl Wayt, Michigantown, Ind.
100 pounds of 8-8-8 on corn gave an extra 40 bushels per acre for Robert A. Jones, Urbana, O.
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Industrial News

New Products *New Plants* *New Appointments*

Sindri Fertilizer Plant

Nears Completion in India

CONSTRUCTION of the Sindri Fertilizer Factory in India is an example of real international cooperation. Chemical Construction Corporation is in charge of design and construction work; the Power Gas Corporation of the United Kingdom is acting as procurement and supply agent to the Indian government; and the engineers responsible for running the plant include one each from England, Germany, and Japan.

Built in Bihar state, near Dhanbad on the Damodar river, the factory will be the largest of its type in Asia. Three of the four main sections—power, gas, and ammonia synthesis are finished and the fourth, the sulfate section, is almost ready for operation.

An annual production target of 350,000 tons of ammonium sulfate is expected to be reached by 1953. Present demand for commercial fertilizers in India is about 400,000 tons annually, but the demand is expected to grow rapidly. Sindri's maximum capacity will meet only one seventh of the ultimate demand expected, between two and three million tons annually.

The Sindri plant has been planned so that the output can be doubled by the installation of additional equipment. It can also be expanded to produce other products including nitric acid, ammonium nitrate, and nitro-chalk.

A major achievement has been the solution of the plant's water supply problem. Adequate supplies are assured for the first two or three years of production and by 1954 it is hoped that completion of the Kinar Dam will help to achieve the estimated maximum need of 12-million gallons daily.

An infiltration gallery was constructed to extract sub-surface water running below the sands in the bed of the river during the hot season when surface flow dries up. Tests have shown that it can yield between five and six million gallons of water a day.

In the ammonium sulfate process, about 900 tons of calcium carbonate sludge will be produced. This by-product will be used as a raw material for a cement factory.

A silo constructed for storage of the finished material is one of the largest monolithic reinforced concrete structures in the world. It has a span of 150-feet, is 90 feet high and is one-eighth of a mile long. A conveyor system permits stocking and removal of the fertilizer without use of manual labor.

Julius Hyman Awarded Recognition for Aid to ECA

A Certificate of Cooperation has been presented to Julius Hyman and Company by the Economic Cooperation Administration. It was awarded as recognition for the assistance the company has given technical men from Western Europe in gaining a better understanding of American business methods.

William C. Foster, ECA Administrator, praised members of the company and pointed out that such cooperation helps in strengthening Western defenses.

Tax Tag Sales Up

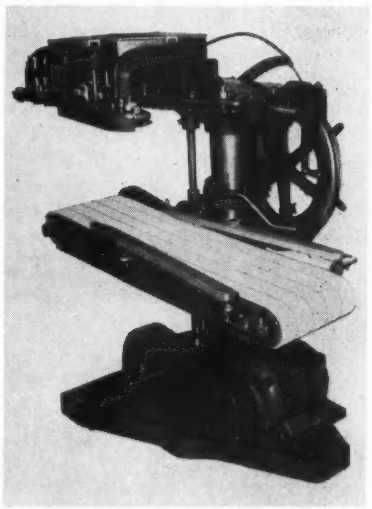
Tax tag sales continued high through the first seven months of 1951. Reports to the National Fertilizer Association from 13 states show that sales are about 6 per cent ahead of the 1950 period.

Tags representing 6.3 million tons of fertilizer were sold in the ten reporting Southern states from January 1 through July 31, 1951. This is 400,000 tons more than the amount sold in the previous period. In the Midwest sales were up 100,000 tons to 1.4 million tons.

August sales were up slightly, totaling 310,200 tons as compared to 305,600 tons during August, 1950, an increase of about 4,600 tons. This includes the reports of 12 states, eight in the South and four in the Midwest. The Southern states showed a decrease of 20,000 tons which was offset by the increase in Midwest sales of about 24,600 tons.

9-1 New Automatic Bag-Closer

The fully automatic Minneapolis Bag Closing Machine is now in quantity production. Hamer Machine Company reports that the closer is capable of handling bags



Minneapolis Bag Closer

weighing from two to one hundred pounds when filled. It will close from 1100 to 1700 ten-pound bags per hour depending on the conveyor set-up.

An arrangement of chain drives compresses the neck of the bag, then seals it with 12-, 14-, or 15-gauge metal wire. The unit is powered by either a one-half or a one horsepower electric motor,

which is considered optional. Bags tied by the machine, the manufacturer says, are neat and uniform, and will not break open during shipping under repeated jolts.

The bag-closing machine can be added to existing facilities or easily adapted to a variety of individually engineered conveyor installations. The standard conveyor, which carries bags to the tying machine, is 41 inches long, 9 inches wide, and can be raised vertically from a point 19 inches above the floor to a maximum height of 30 inches. Other conveyor and belt feeder installations can be built to individual specifications.

The entire unit is mounted on a solid base with three swivel casters, allowing it to be moved about the plant. Five new models, each designed for bags within specific capacity ranges, are now in production. For further information fill in the **Reader's Service Card.** Ask for **9-1.**

English Fertilizer Group Open to Membership

The Fertilizer Society of England, formed three years ago to provide a medium of exchange among those interested in the manufacture of fertilizers, has application forms available to interested persons in the United States.

Membership is open to those engaged in or associated with the manufacture of fertilizers, and members receive the society's publications free of charge. Forms are available from the Secretary, The Fertiliser Society, 44 Russell Square, London, W. C. 1, England.

Kinsey Retires

H. J. Baker and Bro. has announced the retirement of Mr. G. H. Kinsey. The New York concern reports that Mr. Donald Cole has been assigned to take over Mr. Kinsey's activities in the company.

Southern Alkali Changes Name

The corporate name of Southern Alkali Corporation will be changed to Columbia-Southern Chemical Corporation effective September 1. A wholly-owned subsidiary of Pittsburgh Plate Glass Company, the firm is a producer of soda ash, chlorine, caustic soda and related chemicals. Plants are located at Barberton, Ohio; Corpus Christi, Texas; Natrium, West Virginia; Lake Charles, Louisiana and Bartlett, California.

Clarence M. Brown, chairman of the board of directors for both Pittsburgh Plate Glass Company and Columbia-Southern Chemical Corporation, stated that the action involves a change in name only. He said that personnel, policies and customer relations will not be affected.

Next year: 125-million Pounds of Benzene Hexachloride

Industry members have agreed with NPA officials that about 125-million pounds of technical benzene hexachloride will be needed next year and that the industry now has adequate facilities to produce that much.

Last year's production of the insecticide was 72-million pounds, but new production facilities have enabled the industry to produce 80-million pounds in the first six months of the year alone.

Raw materials (benzene and chlorine) appear to be adequate, but members of the Industry Advisory Committee have expressed concern over the availability of steel drums and other containers for shipping their product.

Chapman Now Distributes Pacific Coast Borax Herbicides

Chapman Chemical Company has been appointed distributor of the Pacific Coast Borax Company weed and grass killing products, Borascu and Polybor-Chlorate 88. All of the United States except the Pacific Northwest is covered in the distribution arrangements.

MacDonald Takes Post With International Minerals

The appointment of Robert A. MacDonald as head of the Development Department of the Plant Food Division of International Minerals & Chemical Corporation was announced recently. With the Plant Food Division only a short time, MacDonald was formerly a member of the research group at the corporation's potash refinery at Carlsbad, N. M.

MacDonald is a graduate in chemical engineering of the University of Minnesota. Before joining International's Research Division in 1947 he had served in both research and chemical engineering capacities on the staff of the Minnesota Mining & Manufacturing Company.

Robert A. MacDonald

NFA Fall Meeting Plans Are Now Set

Current research and supply problems facing the fertilizer industry will be discussed at the 1951 Fall meeting of The National Fertilizer Association, to be held November 12, 13 and 14 at the Atlanta Biltmore Hotel, Atlanta, Ga.

Addresses will be delivered at the November 13 session by W. M. Myers, Director of Field Crops Research, U. S. Department of Agriculture, Beltsville, Md. on "Potentialities in Grasslands Improvement," and by H. R. Krueger, Director of Technical Service, Phillips Chemical Company, Bartlesville, Okla. on "Safety in Fertilizer Plants." Mr. Krueger is a member of the Advisory Committee of the National Safety Congress. J. E. Totman, chairman of the Association's Board of Directors, will also address the gathering.

The November 14 program will feature a forum on government controls and orders affecting the fertilizer industry. Participants will include: W. R. Allstetter, Deputy Director, Office of Materials & Facilities, Production & Marketing Administration, U. S. Department of Agriculture; Cedric Gran,

ANTICIPATED PRODUCTION DATE

LATE WINTER OR EARLY SPRING, 1952.

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Consultant, Agricultural Chemicals, Office of Price Stabilization; Kenneth H. Klipstein, Director, Chemical Division, National Production Authority; and Sheldon P. Wimpfen, Division of Raw Materials, Atomic Energy Commission.

A meeting of NFA's Board of Directors will be held November 12.

Hall Takes NPA Post

J. Newton Hall, vice president in charge of sales and marketing, Julius Hyman and Company, has been appointed by the National Production Authority to serve on its Alkali-Chlorine Industry Advisory Committee. Mr. Hall will serve as a member of this Committee until April 1, 1952.

Bemis Wins Safety Award

First prize in the interplant safety contest sponsored by the Safety Council of Greater St. Louis, was awarded to the Bemis Bro. Bag Co., plant in that city.

The Bemis factory had the lowest number of employee accidents per million hours worked of any of the 83 participating plants. Average of all entrants in the contest was 13.27 accidents per million hours worked. The Bemis works had an accident frequency rate of only 4.00.

Lion Names New Public-Relations Director

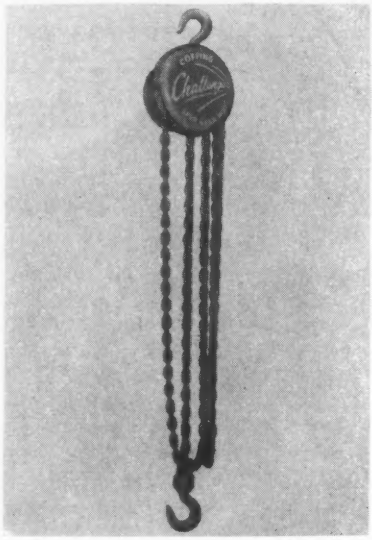
New Director of Public Relations for the Lion Oil Company is John H. Gray. He was formerly an executive of "The Wall Street Journal's" Southwest Edition in Dallas, Tex.

Gray graduated from Cornell University and is a member of the National Journalism Society, Sigma Delta Chi. He served for five years in the Pacific Theatre with the 77th Division, advancing to the rank of major. Gray, his wife and two children will make their home in El Dorado, Ark.

9-2 Spur-Gear Hoists

Two models of the Challenger spur-gear hoist are now in production. The entire unit, in one-half and one ton capacities, weighs only 39½-pounds, including a standard length of coil chain for an eight-foot lift.

Strength and resistance to shock-load breakage are gained by the use of a formed steel plate in the housing. The back plate is laminated to give extra rigidity for support of the hoist mechanism.



Challenger Hand Hoist

This plate and all other load holding parts are of high strength steel that will hold five times the rated capacity of the hoist. To check its strength, every unit is tested at 100 per cent overload by the manufacturer, Coffing Hoist Company.

The Challenger is built so that it may be disassembled in a matter of minutes with simple tools. Another design feature claimed, is that it hangs true with or without a load. For long life each model is sealed and running in lubricant.

Data can be obtained by filling in the **Reader's Service Card.** Ask for **9-2.**

Fourth Generation Bradley Named to Executive Post

Appointment of Peter B. Bradley as assistant managing director of the Bradley Pulverizer company was announced recently by William A. Gibson, managing director and vice president. The appointment marks the fourth generation of Bradleys to hold executive positions with the firm. The new assistant managing director, who is the nephew of the company's president, William L. Bradley, will divide his time between the company's plant at Allentown and the office in New York City.

Two William L. Bradleys and two Peter B. Bradleys have now been connected with the firm since it was founded by the first William L. in 1892 in Boston, Mass. The Allentown plant was established in 1915, and the company also operates a plant in London, England. Current head of the company whose machinery is widely used in the manufacture of farm chemicals, is William L. Bradley, who is also president of Bonneville, Ltd., potash producers, and a partner of the Bradley and Baker Company, fertilizer brokers of New York City.

Superphosphate Production Increased Over Last Year

Production of 18 per cent superphosphate hit a new record during 1950–51 fertilizer year. About 11.3-million tons were manufactured, a 5.6 per cent increase over the 1949–50 figure.

July, 1951, production of all three grades of superphosphate was higher than the corresponding 1950 period. Stocks of normal 18 per cent APA material increased by 127,000 tons to give 1,057,000-tons of stocks at the end of the reporting period. Wet base, 18 per cent material increased by 1500-tons, leaving 6800-tons on hand; and concentrated, 45 per cent superphosphate was upped 3000-tons to give 66,000-tons of stocks at the end of July, this year.

Summers Personnel Changes

Several changes and additions in personnel have been made by Summers Fertilizer Company, Baltimore. R. E. Fraser, vice president and general manager of the Maine operations has been transferred to the home office where he will assume the duties of administrative vice president. Kenneth Lyons will serve as his assistant. Fraser will be succeeded as general manager in Maine by F. L. Litty, vice president elect of Summers and vice president of Northern Chemical Industries.

F. H. Totman, a director of the firm and president of the A. E. Mooers Company, Houlton, Me., is now vice president in charge of Aroostook County sales and branch offices. Assistant treasurer J. C. Totman has been appointed man-

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All Steel Self-Contained Fertilizer Mixing and Bagging Units

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THE JAITE COMPANY

"Manufacturers of Paper and Paper Bags"

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SINCE 1905

FERTILIZER MATERIALS

LOW AND HIGH TEST ORGANICS

MATERIALS FOR DIRECT APPLICATION

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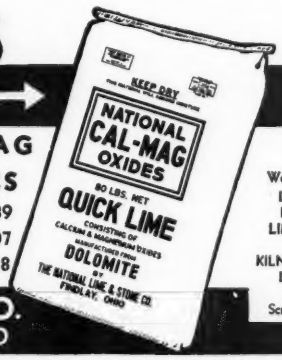

We Also Produce DOLOMITIC HYDRATED LIME (165 TNP) and KILN DRIED RAW DOLOMITE (107 TNP) Screened to size

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General Offices • • • • • FINDLAY, OHIO

ager of the Bangor branch with Donald Thompson, a former salesman, as his assistant.

William Rasmussen has been named assistant to the manager of Summers' Red River Division, Grand Forks, N. D., and Gordon Tollerud is now agronomist.

The assistant secretary, Howard Miller, has been recalled by the Army and received a leave of absence for the period of his service. Owen Hannigan, manager of the Houlton, Me., plant has been granted a six months' leave of absence.

Pennsalt Names Three

Charles G. Whinfrey, Jr. has been appointed sales supervisor of Pennsylvania Salt's Agricultural Chemicals Department. His new duties will include supervision of the field sales-service representatives and direction of sales training and sales promotion activities.

Whinfrey has been with Pennsalt since 1948 and was formerly technical sales representative in New England and the northeastern territory. He graduated from Cornell University, majoring in plant sciences.

Two other appointments were announced by the company. Donald E. Hope now holds Whinfrey's former position and John R. Keefer has joined the Philadelphia staff as a sales correspondent.

Wanted: Chemical engineer to establish office in New York City for French designer and manufacturer of plant equipment for fertilizer producers in Europe. Address—Box 350, FARM CHEMICALS, 317 N. Broad St., Philadelphia 7, Penna.

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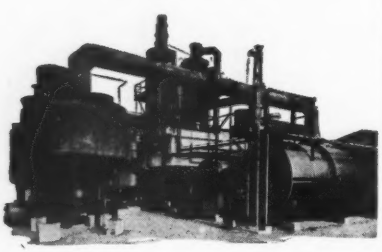

Chemico's services cover every detail in design and construction of sulphuric acid plants, acid concentrators, complete fertilizer plants and P-A Venturi Scrubbers for fluorine fume elimination.

Chemico's performance guarantees are backed up by 35 years of experience. Consultation involves no obligation.

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Poulsen Company Moves to New Larger Plant

Materially increased demand for their equipment and engineering service has compelled A. E. Poulsen & Company to acquire larger production facilities.

The well known west coast manufacturer of processing equipment engineered specifically for the insecticide, fertilizer, food, feed and seed industries, has moved its plant and offices to 3305 East Slauson Avenue in the Center of the Los Angeles industrial district. The new plant provides five times their former production capacity according to A. E. Poulsen, president of the company.

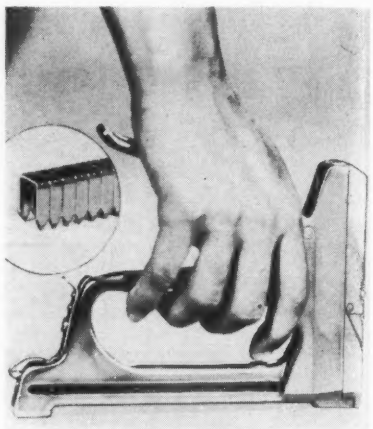
9-3 Heavy-Duty Hand Stapler

A handy new pocket-sized stapling gun that packs five times the power of ordinary one-hand industrial tackers has been developed by The Heller Company.

Sturdy and streamlined, the tool is said to be the first one-hand stapler capable of fastening metal or fibre shipping tags to export boxes. It saves time and manpower for the shipper, fastening tags in one-fifth the time needed for hammer and nails.

The operator holds the tag in place with one hand, then shoots staples as fast as firing a Colt automatic. Heller heavy duty staples are five times normal size, and grip the wood securely with a super-clinch locking feature.

The Heller one-hand Stapling Gun, backed by a 10-year guarantee, is also used for stapling shipping list protectors, linings of export boxes, fibre packing list covers, railroad box car linings, car identification tags and many other operations where speed and secure fastening are needed. For complete details, fill out **Reader Service Card.** Use the number **9-3.**



Handy for lining box-cars

Gerald D. Baerman Appointed by NACO

Gerald D. Baerman has been named director of all insecticide activities of Naco Fertilizer Company, according to an announcement made by Kenneth D. Morrison, president.

Mr. Baerman was previously associated with Shell Chemical Corporation in their Agricultural Products Department. Naco Fertilizer Company operates insecticide plants at Charleston, South Carolina, Wilmington, North Carolina, Jacksonville and Ft. Pierce, Florida, and Findlay, Ohio.

Sulfur Requirements to Exceed Production

NPA and the Sulfur Industry Advisory Committee agreed, at a recent meeting, that fourth quarter requirements of sulfur will exceed production by about 100,000 tons.

Three possible solutions were suggested by the NPA: curtailment of less essential uses of sulfur and its derivatives, an order limiting sulfur consumer inventories to 25 per cent of their 1950 use, and encouragement of recovery and production of sulfur by companies using it.

The first possibility was elim-

MONARCH SPRAYS

This is our Fig. 645 Nozzle. Used for Scrubbing Acid Phosphate Gases. Made for "full" or "hollow" cone in brass and "Everdur." We also make "Non-Clog" Nozzles in Brass and Steel, and

Stoneware Chamber Sprays

now used by nearly all chamber spray sulphuric acid plants.

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Use this Hayward Class "K" Clam Shell for severe superphosphate digging and handling.

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PHOSPHATE ROCKS and LIMESTONE

Capacities 1 to 50 Tons Per Hour

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A reference booklet for all who are interested in the manufacture and use of chemical fertilizers. It's "priceless" to agricultural chemists and fertilizer salesmen.

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MARIETTA air cell silos CAN BE ERECTED THE WAY YOU WANT THEM!

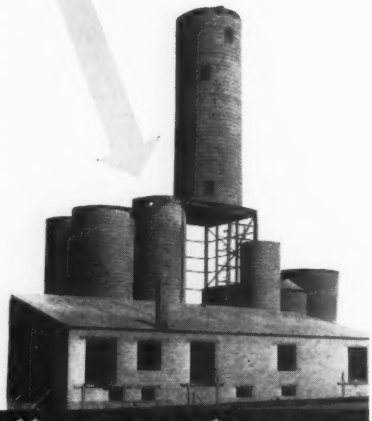
If you need storage tanks in line, in clusters or combined with existing units . . . in sizes from 10′ to 30′ in diameter, and 30′ x 100′ in height, Marietta can quickly erect them.

Marietta tanks allow flexible planning . . . give you permanent, protected storage where you want it, the way you want it.

Marietta's Air-Cell construction keeps out moisture, reduces spoilage, keeps fertilizers and bulk materials BONE DRY!

For dependable, year 'round facilities that are wind and fire proof, designed to lower insurance rates, insist on Marietta.

Write or wire our nearest office. Ask for Bulletin 1815.



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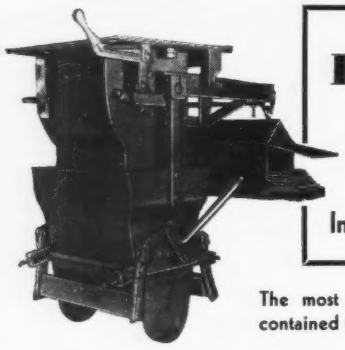

BEATS *Anything* YOU HAVE EVER SEEN

In The Way Of A Bagging Scale

The most highly perfected low priced, completely self-contained bagging unit ever produced. This remarkable new

APEX BAGGING SCALE

FOR FREE FLOWING MATERIALS

combines speedy filling and accurate weighing in one simple semi-automatic operation. Four to six 100 lb. bags per minute. Extremely easy to operate. Requires small installation space. Quickly attaches to any wood or metal hopper.

GIVES YOU MANY ADVANCED AND EXCLUSIVE FEATURES

Including: one-piece over and under indicator; incomparable bag clamp; protective dust evacuating shield; 2 to 1 leverage system; extra large, trouble-free dash pot; simple control gate.

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inated because such a program could not be put into effect in time to help alleviate the fourth quarter shortage. Commenting on the second NPA recommendation, industry spokesmen said that inventory restrictions would make little additional sulfur available and that normal methods of shipment would be disrupted.

The committee suggested that most sulfur uses be restricted below the present permitted rate of 100 per cent of their 1950 use. NPA officials said that this recommendation, if carried out, would result in hardships throughout a wide range of industries and would tend to reduce production at a time when greater output is needed.

In a summary of the sulfur picture, NPA showed that if the present rate of consumption is permitted to continue, about 1.1 tons of sulfur would be consumed in the United States during the fourth quarter. Canada would use about 81,500 tons and about 257,000 tons would be exported.

The total consumption would be 1,438,500 tons against the estimated fourth quarter consumption of 1,338,500. Officials said that a decision on the action to be taken to overcome the 100,000-ton deficit will be reached soon.

According to NPA the long range out look is better. Officials pointed out that in 1953 a sulfur deposit recently discovered in the Gulf of Mexico will go into production and may produce as much as 500,000 tons a year.

9-4 "Prosper Plenty" Comic Hero Tells Fertilizer Story

"The Conquest of Hunger," published by the National Fertilizer Association, is an easy-to-grasp story of the use of fertilizers in supplying a hungry world with food. Presented in comic book style so that even school children can grasp the fundamentals, the booklet also contains enough basic information to make it worthwhile for adults, particularly those who may have no previous information as to the origin, nature, and value of present-day fertilizers.

Copies of the booklet, at $4.00 per hundred, can be obtained through the Association at nominal cost. If desired, your firm name

can be printed on the booklet at a slight additional charge. NFA reports that many fertilizer companies are using the comic book, which features "Prosper Plenty" as its hero, as an educational mailing piece.

To make it convenient for you to express your interest, you may fill out the **Reader Service Card** and we will forward your requests to the Association. Use number **9-4.**

Powell Appoints Straube

Harold L. Straube has been named operations manager of John Powell and Company, Inc. Former general manager of an affiliate company, John Powell Chemical

Harold L. Straube

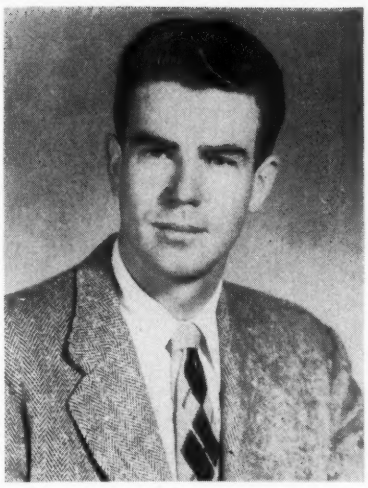
Co., Huntsville, Ala., his duties will include operations management of both the Huntsville and New York plants.

Morton E. Bader is now acting general manager of the Huntsville affiliate.

American Cyanamid Places Three Men in New Positions

Three recent appointments have been announced by American Cyanamid Company. Dr. W. N. Oldham is now manager of the Azusa, Calif., plant; W. D. Holland has been named production manager of the Agricultural Chemicals Division, and William A. Gauntt is now serving in the Binghamton, N. Y. office.

Oldham was formerly assistant



William A. Gauntt

plant manager of the Azusa plant which manufactures monosodium cyanamid for cotton dusting among other chemicals.

Before his advancement, Holland was assistant to Vice-president E. D. Powers. Gauntt will handle sales of fertilizer, insecticides, and feed products in the northeastern states.

Plant Pathologist Joins Ethyl Corporation Staff

Ethyl Corporation has appointed Richard P. Porter to their product development staff. Porter, a plant pathologist, will assist Dr. C. L. Smith who is in charge of development work on farm chemicals.

Porter will assist in the development of new farm chemicals, acquaint organizations with Ethyl's activities in the field, and participate in field tests and cooperative work with experiment stations. Prior to joining the Ethyl Corporation, Porter served as assistant manager of Innis, Speiden and Company's insecticide department.

Superphosphate Price Increase Is Suggested

Members of the Superphosphate Industry Advisory Committee recommended a regulation permitting a flat increase in cents per unit to their pre-Korean prices. The addition would be made to cover cost increase since that time.

Committeemen said that the group could supply figures on increased costs and suggested that the information be submitted on a cost increase per unit basis. It

Your partners

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are the farm families throughout the nation who buy your products. Many of their production needs are closely related to yours.

Their success in meeting this year's greatly increased food and fiber goals depends to a large extent upon your ability to manufacture and distribute essential supplies of fertilizers and pesticides.

Farm organization leaders, along with their experienced Washington staffs, are constantly presenting factual data on farm operations to key Congressional and Government officials.

Mounting defense production problems clearly show the need for close liaison between leaders in both groups.

It is apparent that you will both make a greater contribution toward a stronger America with a full breadbasket by . . . working together as partners.

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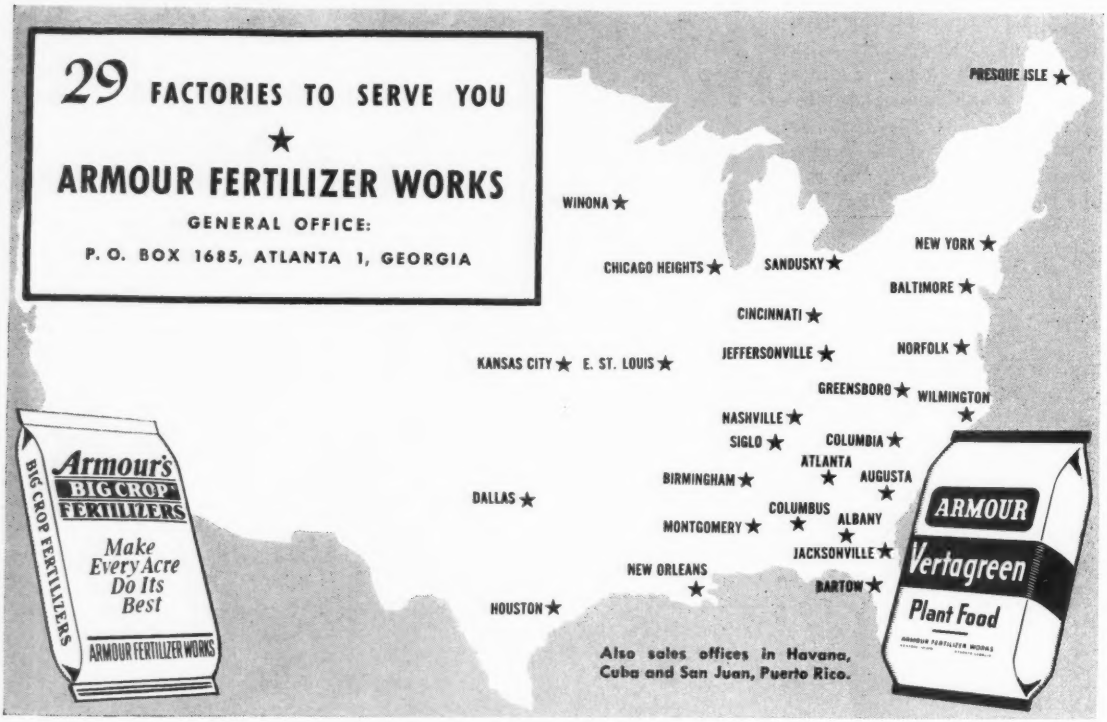

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Free Information

On each of the two postage-paid postcards be ow you can request further information on four items described on this and t'e Industrial News section of this issue. Fill out one quarter section for each item in which you are interested.

9-5 Sift-Proof Bag and Closer

If there is any bag that positively won't permit dry particles to sift, Betner claims they have it, in their line of "Duo-Tite" bags. The company reports that the bag with its inner heat-seal and its method of folding the closure makes the bag perfect for insecticides, fertilizers, and other chemicals that must be packaged in sift-proof containers. A special machine for making the heat-seal and double fold is available through the Betner Company.

9-6 A-B-C Hand Gluer

Operation of the A-B-C Packaging Machine Corporation's hand gluer, is outlined in a leaflet that has been issued by the company.

The specific functions of the gluer, plus a list of over-all machine dimensions and dimensions of packages to which the machine is adjustable are listed in the leaflet. A descriptive photograph of the hand gluer is shown in the leaflet.

9-7 Multi-Purpose Mixer

Dispersing, emulsifying, and milling can all be done in one operation, it is claimed, with Abbe's Dispersall Mixer.

A bulletin describing the machine and the principles upon which it operates indicates that it can be a helpful short cut on all fluid mixing and many paste mixing and blending operations. The mixers are available in capacities from ½-gallon to 330-gallons.

9-8 Ammonia System Materials

Materials for handling nitrogen solutions in fertilizer mixing plants are exacting in their requirements. This is true because of the corrosive nature of ammonia-bearing atmospheres. In addition, the system must be designed and installed by experienced people familiar with the characteristics of nitrogen solutions in fertilizer manufacture.

Here is a list of the NEW PRODUCTS and BULLETINS described on this and the Industrial News pages of this issue giving their monthly code number.

- 9-1 Automatic Bag Closer
- 9-2 Spur-Gear Hoists
- 9-3 Hand Stapler
- 9-4 "Prosper Plenty"
- 9-5 Sift-Proof Bag
- 9-6 A-B-C Hand Gluer
- 9-7 Multi-Purpose Mixer
- 9-8 Ammonia Systems
- 9-9 Motor Starter
- 9-10 Facts on Bagpak
- 9-11 Duplex Net Weighers
- 9-12 Hoppers and Mixers
- 9-13 Fibre Drums
- 9-14 Short-Cut Soil Tester
- 9-15 Weed Control
- 9-16 Dieldrin Information
- 9-17 Sprayer Duster
- 9-18 Bentonite

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FARM CHEMICALS
PHILADELPHIA 7, PA.

51 ☐

Write in the number of the product about which you want more information

Name.....
Title.....
Company.....
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.....
FARM CHEMICALS
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Write in the number of the product about which you want more information

A very useful bulletin by the J. M. Tull Metal and Supply Company gives a description of a typical installation, complete with specifications and diagrams, together with a typical bill of materials.

9-9 Light Weight Motor Starter

"Explo-Safe" and Weatherproof motor starters are described in a new eight-page illustrated folder on a new line of Arrow-Hart units. Complete information is given, including dimensions, weights, ratings and wiring diagrams for these magnetic across-the-line starters. The manufacturer claims the units are smaller and lighter than conventional motor starters.

9-10 Facts on Bagpak

Bagpak, International Paper Company, has issued a booklet on "Quick Facts on Bagpak Machinery and Multiwall Paper Bags." The booklet describes the company's bag-packing machinery as to types, models, and specific operations of each. Photographs of the manner in which bags are sealed by each machine are included in the booklet together with information on the bagpak cushion stitch.

9-11 Duplex Net Weighers

B. F. Gump Company has available a bulletin about its Edtbauer-Duplex Net Weighers. The bulletin outlines the company's complete line of weighers along with photographs and diagrams of the equipment.

The equipment is shown in cross-section diagrams while in actual operation.

9-12 Hoppers and Mixing Systems

A twenty-one page manual is now being offered by the Chemical Engineering Service, Inc.

The manual contains information on C-E Hoppers and mixing systems now available to small manufacturers as well as large, and includes diagrams and illustrations of the hoppers.

Operating arrangements and capacity specifications are also listed in the manual.

9-13 Fibre Drums

A list of many of the sizes and styles of fibre drums, information about them, plus illustrations showing how to use them is available from the Fibre Drum Manufacturers Association in a catalog describing the products.

The catalog lists the various uses for the fibre drum including foods of many types, metal parts, plastics, insecticides, colors, dessicants, feeds, dyestuffs, medicinals, germicides, resins, waxes, and many others.

9-14 Short-Cut Soil Tester

The LaMotte "Short-Cut" Soil Tester, is a new unit described in a pamphlet put out by the La Motte Chemical Products Company.

The pamphlet describes the complete, portable outfit, which is for use in the field or office for studying the nutrient requirements of various soils.

9-15 Weed Control in Grain

Entitled "Chemical Weed Control in Small Grains," a bulletin is now being offered by the Monsanto Chemical Company.

The bulletin deals with such information as the advantages of controlling weeds chemically in small grains, chemicals recommended for weed control in small grains, range of application rates and formulas for distribution of volume.

9-16 Dieldrin Information

A booklet containing information on Dieldrin has been issued by Julius Hyman and Company.

The booklet lists, in question-and-answer form, many types of information on the insecticide. These include comparisons with DDT in specific cases, proper use for best effect, and period of potency after application. Insect control, proper dosage, and probable results are also listed in the booklet.

9-17 Sprayer-Duster

Turbulent Air Sprayer-Dusters made by the Buffalo Turbine Agricultural Equipment Co., Inc., are described in a pamphlet published by the company. What the machine can do, and how it operates, along with general specifications on engine, liquid tank, dust bin, pump, turbine, air nozzles, frame, trailer, belts, turntable, bearings, lubrication, and shipping weights crated, are listed in the leaflet.

9-18 Black Hills Bentonite

Black Hills Bentonite is described as a carrier, diluent, and emulsifying agent in a new booklet put out by Eastern Clay Products, Inc. The booklet gives the characteristics and composition of the clay, its production and grades and also its modern industrial applications as a fertilizer carrier, fungicide, foundry sand binder, a detergent, spray, paste, polish, cleanser, and many other uses.

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Attention: **A. M. Brodine, Managing Editor**

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Attention: **A. M. Brodine, Managing Editor**

was proposed that average costs for the year ending June 30, 1950 be compared with those in a period of six months or more ending June 30, 1951. In addition the suggestion was made that adjustment for recent increases be made to spread them over the average for the entire second fiscal period for purposes of comparison.

OPS was requested to study the problem that will be created by expiration of existing wage contracts at the end of the year and the increased overhead costs if use of sulfuric acid in the manufacture of superphosphate should be curtailed.

Cost Questionnaire for Fertilizers Is Reviewed

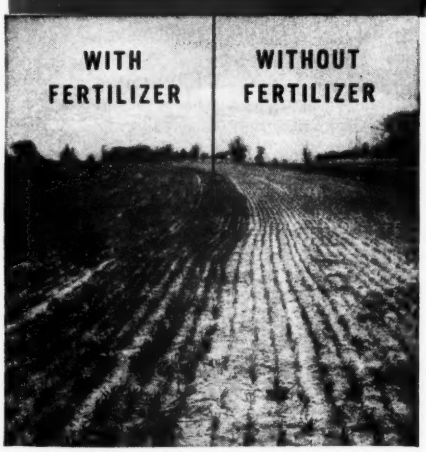
A proposed cost questionnaire was reviewed at the second meeting of the Mixed Fertilizer Industry Advisory Committee with OPS officials. The form is to be submitted to the industry for data required for a tailored regulation.

Several changes were made in the questionnaire at the meeting, as a result of suggestions by the committee members. The suggestions dealt with the selection of base periods for cost comparison purposes, the form in which raw material cost increases were to be submitted, the reporting of the selling prices for mixed fertilizers for both periods and other details.

Industry representatives urged that the revised forms be prepared as promptly as possible and that a time limit of 30 days be placed on the replies. Leaders pointed out the need for having new ceilings established by November 1 because more than 90 per cent of the fertilizer sales occur between that date and May 31.

When the forms have been returned another meeting will be held for review of the tabulated averages. Decision will then be made as to whether the tailored

Fertilizer Makes Wheat Get Up and Grow!



THESE ILLUSTRATIONS AND HEADLINE are from Barrett advertisements in Midwestern farm magazines, urging farmers to use plenty of well-balanced complete fertilizer when wheat is seeded in the fall.

A bigger tonnage of fertilizer, sold and delivered in the fall, means a bigger total tonnage supplied to farms during the 1951-52 fertilizer year.

Barrett advertising is designed to assist in extending the movement of complete fertilizer over a longer period —thus enabling the fertilizer industry to manufacture and deliver a bigger tonnage.

THE BARRETT DIVISION
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Barrett NITROGEN*

New York 6, N. Y. • Richmond 19, Va. • South Point, Ohio • Hopewell, Va. • Atlanta 3, Ga. • Columbia 1, S. C. • San Francisco 3, Cal.

THE ELEMENT THAT MAKES PLANTS GROW!

*Reg. U. S. Pat. Off.

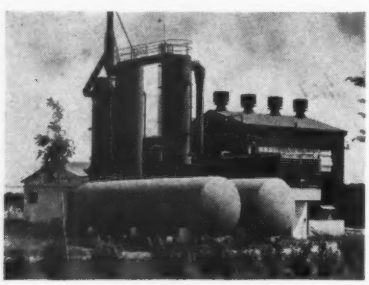
regulation will mean dollar and cents ceiling prices for leading fertilizer grades or merely percentage adjustment factors to be applied by each mixer to his base period prices to determine his new ceilings.

Armour Research Foundation Hires Professor of Soils

The Armour Research Foundation of the Illinois Institute of Technology recently appointed Dr. Richard A. Carrigan, supervisor of the analytical chemistry section of the Institute.

Dr. Carrigan, biochemist and professor of soils at the University of Florida, has specialized in spectroscopy, chemical analysis, and agronomy. He has published numerous articles on trace elements in soils and their relationship to plant and animal nutrition.

Carrigan was graduated with a bachelor's degree from the University of Florida in 1932 and received his Ph.D. from Cornell University in 1948. He was a chemist for the Magnolia Petroleum Co., Beaumont, Tex., for five years before returning to the University of Florida in 1938.



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Sulfur . . .

(*Continued from page 20*)

An effort was made to find out the need for addition of sulfur to the soils of the several states. A questionnaire sent to agronomists of state colleges and universities brought replies from 45 of them. In compiling information from the questionnaires the states were divided into four groups on the basis of sulfur requirements as follows,— (1) states in which there is no evidence of a sulfur deficiency, (2) states in which the sulfur in precipitation compensates for any soil deficiency; (3) states in which there would be a sulfur deficiency if it were not for the sulfur contained in fertilizers applied, and (4) states in which sulfur is needed in addition to that supplied in fertilizers and precipitation. The results appear in Tables 8 and 9. This classification of the states is undoubtedly incorrect in some cases but it is based on the best evidence available at the present time. The placing of a state in a given group does not mean that *all* the soils in the state have the sulfur requirement indicated by the group heading. For example, California is placed in the group needing more sulfur than is supplied by fertilizer and precipitation, and yet some of the soils in the state have an abundance, if not an excess, of sulfur.

Conclusions

In conclusion the following points may be emphasized:

1. Crop requirements for sulfur are too large to be ignored.

2. Sulfur supplies in most soils are not large and the rate of dissipation is increased when soils are placed under cultivation.

3. There are grounds for believing that if it were not for the sulfur supplied from the atmosphere and in fertilizers, a large majority of the crop land in the United States would be deficient in sulfur for satisfactory yields of many crops.

4. Also in extensive areas not near industrial centers, a serious deficiency of sulfur would probably exist if it were not for fertilizer applications.

5. Accordingly, any marked decrease in the sulfur content of commonly used fertilizers would require the addition of some other source of sulfur if crop yields are to be maintained. ◆

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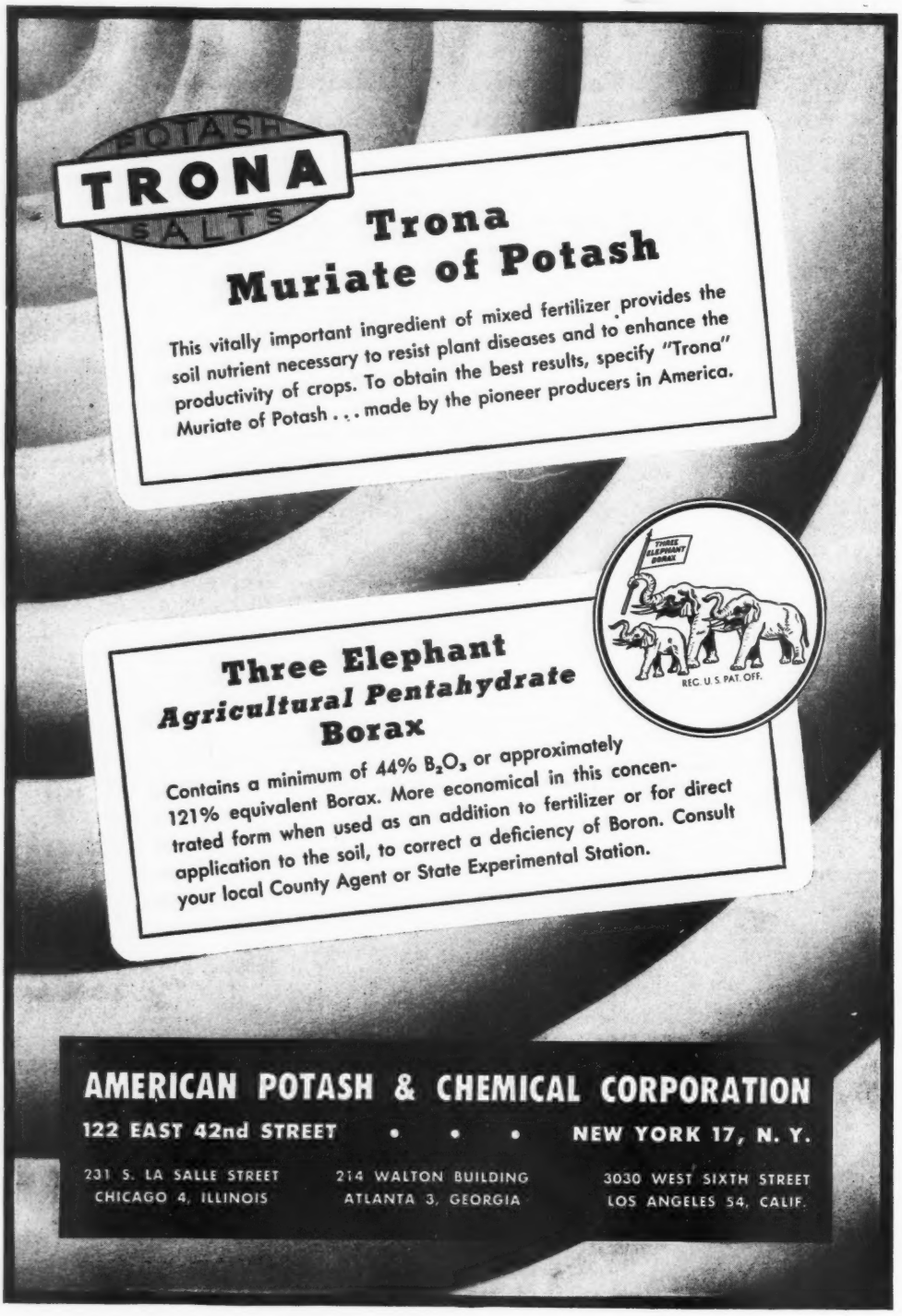
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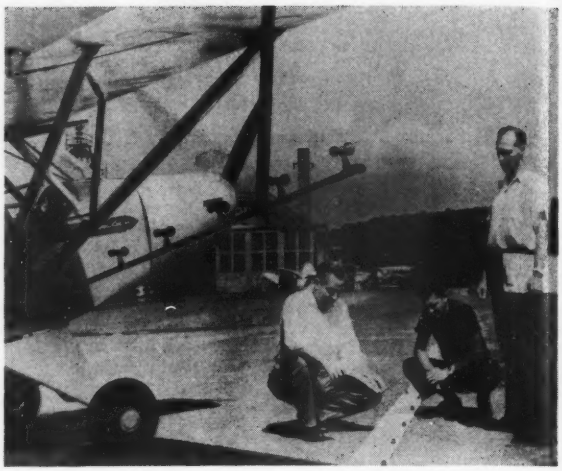

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The group is headed by (left to right, in picture above) Rex Taylor, Chief of Piper's Experimental Division, Alfred B. Munroe, veteran agricultural pilot, and Howard Piper, Assistant to the President, shown here examining the uniformity of spray application on a test strip of paper.

Mr. Taylor has been with Piper for 14 years and served for a period during World War II as a field service representative in the Pacific where Piper grasshopper planes were used extensively. Mr. Munroe is a pilot of 16 years' experience, having devoted the past six years to extensive aerial application work.

Mr. Piper, a former Naval Aviator, has been responsible for many of the latest Piper plane designs and personally owns a company operating a fleet of Piper spray planes in the west, from which valuable data is being obtained to integrate into new Piper agricultural plane developments.

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GREEN PASTURES

The Green Pastures movement is spreading over the American countryside increasing both the value of the land and the production of livestock.

Through the cooperation of the County Agents, Extension Services, Colleges and Fertilizer Manufacturers, this program is developing rapidly. P. C. A. is proud to have a part in furthering the growth of Green Pastures.

POTASH COMPANY OF AMERICA
Carlsbad, New Mexico

GENERAL SALES OFFICE...1625 Eye St., N. W., Washington, D. C.
MIDWESTERN SALES OFFICE...First National Bank Bldg., Peoria, Ill.
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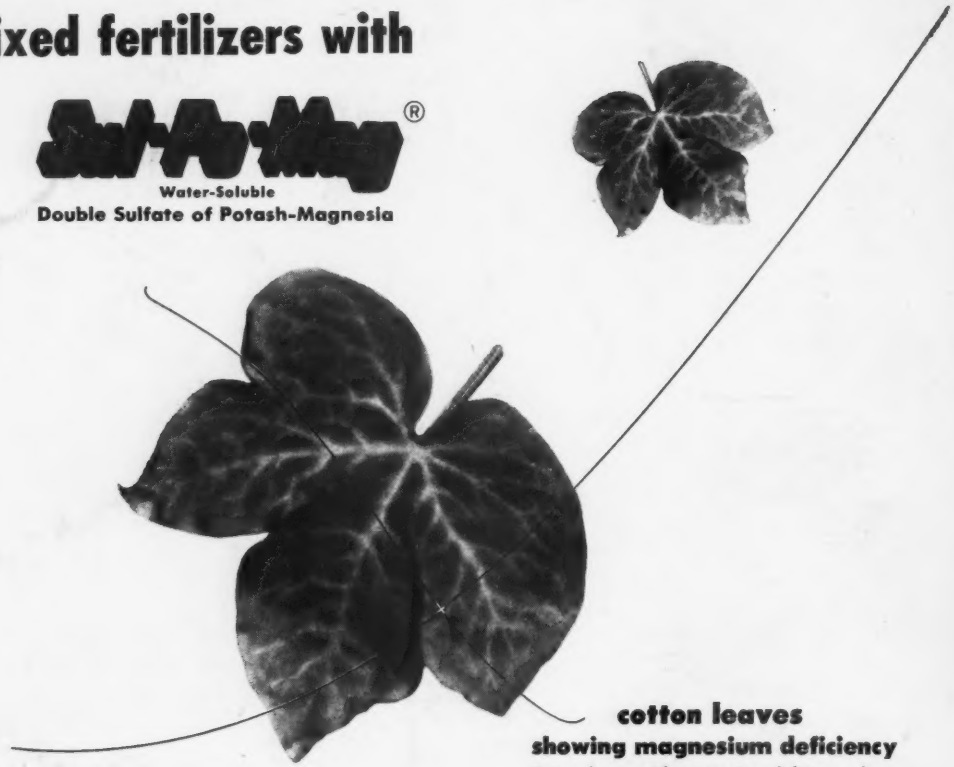
...RARY UNIVERSITY FARM...
PAUL ...OTA. ZONE-8

You can supply magnesium in the most effective way in mixed fertilizers with

Sul-Po-Mag®

Water-Soluble
Double Sulfate of Potash-Magnesia



cotton leaves
showing magnesium deficiency

Cotton leaves with magnesium deficiency show purplish-red color with green veins. Second in a series of six advertisements showing magnesium deficiency symptoms in tobacco, cotton, grapefruit, corn, potatoes and oats.

More and more farmers in many areas are recognizing the importance of magnesium to the healthy growth of their crops. Many are learning by actual experience that their soils must have an adequate supply of this essential plant nutrient in order to produce the large yields of high quality crops that bring more profit per acre at harvest time.

The most practical and economical way to supply your farm customers with magnesium . . . in the soluble form they want . . . is to use *Sul-Po-Mag* as a regular ingredient in the fertilizer grades you supply for crops grown on magnesium-deficient soils.

Sul-Po-Mag, produced exclusively by *International* is a properly balanced combination of potash and magnesium, both in water-soluble form and immediately available to the growing crops. It is being produced in larger quantities than ever before to meet the increasing demands of farmers for *Sul-Po-Mag* in complete fertilizers and for direct application.

SUL-PO-MAG (Water-Soluble Double Sulfate of Potash-Magnesia)
MURIATE OF POTASH SULFATE OF POTASH

THIS IS WHY GROWING PLANTS MUST HAVE MAGNESIUM

- It is required in the life process which gives plants their green color and keeps them growing.
- Promotes earlier maturity on soils low in magnesium.
- Enables crops to make better use of other plant foods.
- Carries phosphorus to the growing and fruiting parts of the plant.
- Necessary for the development of seed.
- Promotes the formation of proteins in growing crops.
- Stimulates growth of soil bacteria and fixation of nitrogen by legumes.
- Increases the plant's resistance to diseases.

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OF THIS NEW SUL-PO-MAG BOOK

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